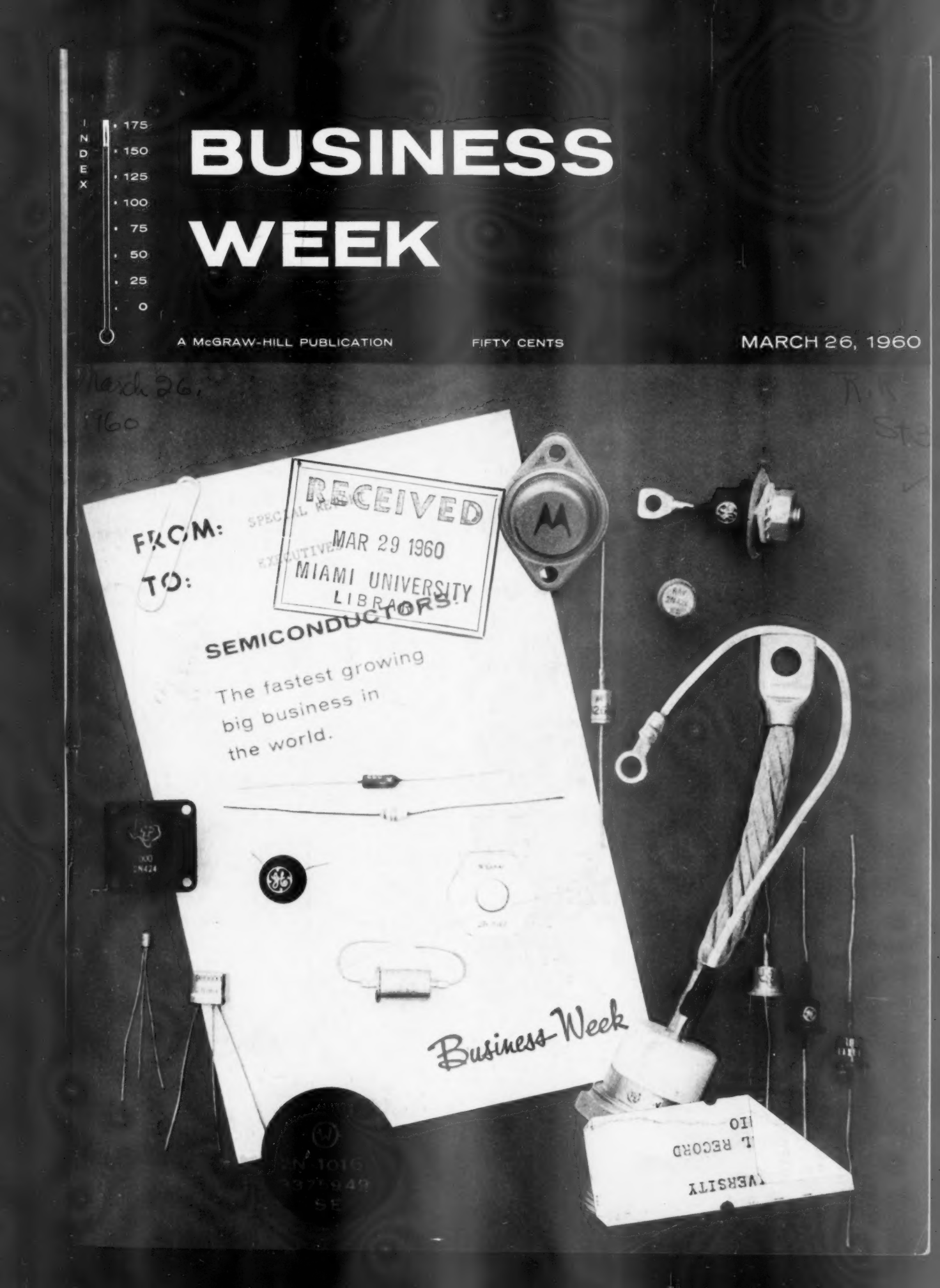
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BUSINESS WEEK
A McGRAW-HILL PUBLICATION
FIFTY CENTS
MARCH 26, 1960
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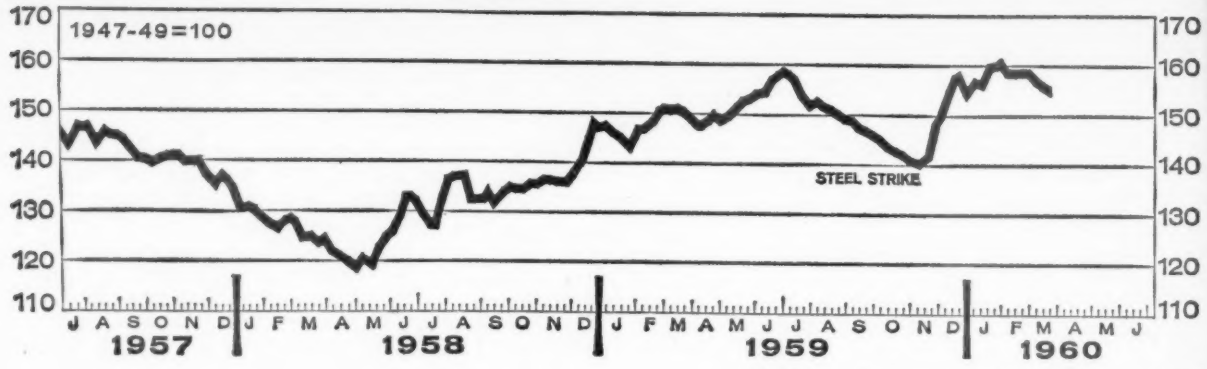
NUMBER 1595

FIGURES of the WEEK



	1953-55 Average	Year Ago	Month Ago	Week Ago	§ Latest Week
BUSINESS WEEK INDEX (chart)	**133.3**	**151.0**	**159.3**	**156.7r**	**156.0***
PRODUCTION					
Steel ingot (thous. of tons)	2,032	2,631	2,690	2,607r	**2,554**
Automobiles	125,553	135,466	158,898	145,967r	**147,930**
Engineering const. awards (Eng. News-Rec. 4-wk. daily av. in thous.)	$52,412	$68,514	$60,971	$64,005	**$67,411**
Electric power (millions of kilowatt-hours)	10,819	12,900	14,226	14,271	**14,109**
Crude oil and condensate (daily av., thous. of bbl.)	6,536	7,203	7,312	7,049	**7,116**
Bituminous coal (daily av., thous. of tons)	1,455	1,300	1,382	1,267r	**1,292**
Paperboard (tons)	247,488	306,218	329,793	319,033	**320,721**
TRADE					
Carloadings: mfrs., miscellaneous and l.c.l. (daily av., thous. of cars)	70	61	58	57	**57**
Carloadings: all others (daily av., thous. of cars)	47	38	38	36	**37**
Department store sales index (1947-49 = 100, not seasonally adjusted)	121	124	115	98	**116**
Business failures (Dun & Bradstreet, number)	198	292	289	290	**302**
PRICES					
Industrial raw materials, daily index (BLS, 1947-49 = 100)	89.2	91.6	92.2	90.9	**91.3**
Foodstuffs, daily index (BLS, 1947-49 = 100)	90.5	79.9	72.5	74.2	**74.8**
Print cloth (spot and nearby, yd.)	19.8¢	18.6¢	22.2¢	21.8¢	**21.0¢**
Finished steel, index (BLS, 1947-49 = 100)	143.9	186.7	186.8	186.8	**186.8**
Scrap steel composite (Iron Age, ton)	$36.10	$40.50	$37.17	$33.50	**$33.33**
Copper (electrolytic, delivered price, E&MJ, lb.)	32.394¢	31.965¢	33.094¢	33.000¢	**33.000¢**
Aluminum, primary pig (U. S. del., E&MJ, lb.)	20.6¢	24.7¢	26.0¢	26.0¢	**26.0¢**
Aluminum, secondary alloy #380, 1% zinc (U. S. del., E&MJ, lb.)	‡	21.77¢	25.02¢	25.02¢	**25.02¢**
Wheat (No. 2, hard and dark hard winter, Kansas City, bu.)	$2.34	$2.06	$2.10	$2.12	**$2.14**
Cotton, daily price (middling, 1 in., 14 designated markets, lb.)	34.57¢	34.42¢	32.05¢	32.03¢	**32.03¢**
Wool tops (Boston, lb.)	$1.96	$1.63	$1.77	$1.75	**$1.78**
FINANCE					
500 stocks composite, price index (S&P's, 1941-43 = 10)	31.64	56.09	55.93	54.43	**55.41**
Medium grade corporate bond yield (Baa issues, Moody's)	3.59%	4.83%	5.31%	5.27%	**5.24%**
Prime commercial paper, 4 to 6 months, N. Y. City (prevailing rate)	2–2⅛%	3⅜%	4¾–4⅜%	4⅜%	**4½%**
BANKING (Millions of Dollars)					
Demand deposits adjusted, reporting member banks	‡	61,233	59,395	59,586	**60,286**
Total loans and investments, reporting member banks	‡	102,446	101,565	100,986	**102,153**
Commercial, industrial, and agricultural loans, reporting member banks	‡	32,352	31,175	31,219	**31,966**
U. S. gov't guaranteed obligations held, reporting member banks	‡	32,852	25,711	25,068	**25,107**
Total federal reserve credit outstanding	26,424	26,976	27,135	27,075	**27,197**

MONTHLY FIGURES OF THE WEEK		1953-55 Average	Year Ago	Month Ago	Latest Month
Wholesale prices (U. S. Dept. of Labor BLS, 1947-49=100)	**February**	110.4	119.5	119.3	**119.4**
McGraw-Hill Indexes of New Orders (1950=100)					
New Orders for machinery, except electrical (seasonally adjusted)	**February**	104	176	172	**164**
Construction & mining machinery	**February**	111	197	182	**204**
Engines & turbines	**February**	106	192	140	**173**
Pumps & compressors	**February**	120	260	284	**353**
Metalworking machinery	**February**	125	144	172	**164**
Other industrial machinery	**February**	95	181	153	**141**
Office equipment	**February**	109	185	210	**206**
New contracts for industrial building	**February**	128	122	129	**159**

* *Preliminary, week ended March 19, 1960.*
‡ *Not available.*
r *Revised.*
§ *Date for 'Latest Week' on each series on request.*

THE PICTURES—28—Ed Malsberg; 30-31—H. Grant Compton; 63—Stamp Audit Co.; 64—WW; 74—Beinlich; 75—H. Grant Compton; 76—(top) John Coneen, (bottom) H. Grant Compton; 78—John Coneen; 83—George Woodruff; 85—H. Grant Compton; 86—(top) GE, (bottom) H. Grant Compton; 93—Texas Instruments; 94-96—H. Grant Compton; 101—WW; 103—GE; 104—(top) Raytheon, (bottom) Semicon Inc.; 106—Westinghouse; 108-110—Wayne Miller; 113—Texas Instruments; 114—(top) Westinghouse, (bottom) H. Grant Compton; 116—(top) H. Grant Compton, (bottom) Texas Instruments; 121—H. Grant Compton; 130-131—McGraw-Hill World News; 145—UPI; 149—Dohrty Assoc. Inc.; 162-163—WW; 168-169—Thomas M. O'Reilly; 174—(top) GE, (bottom) W. R. Grace and Co.; 176—L. C. Davidson.

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§ Latest Week
156.0*
2,554
147,930
$67,411
14,109
7,116
1,292
320,721
57
37
116
302
91.3
74.8
21.0¢
186.8
$33.33
83.000¢
26.0¢
25.02¢
$2.14
32.03¢
$1.78
55.41
5.24%
4½%
60,286
102,153
31,966
25,107
27,197
Latest Month
119.4
164
204
173
353
164
141
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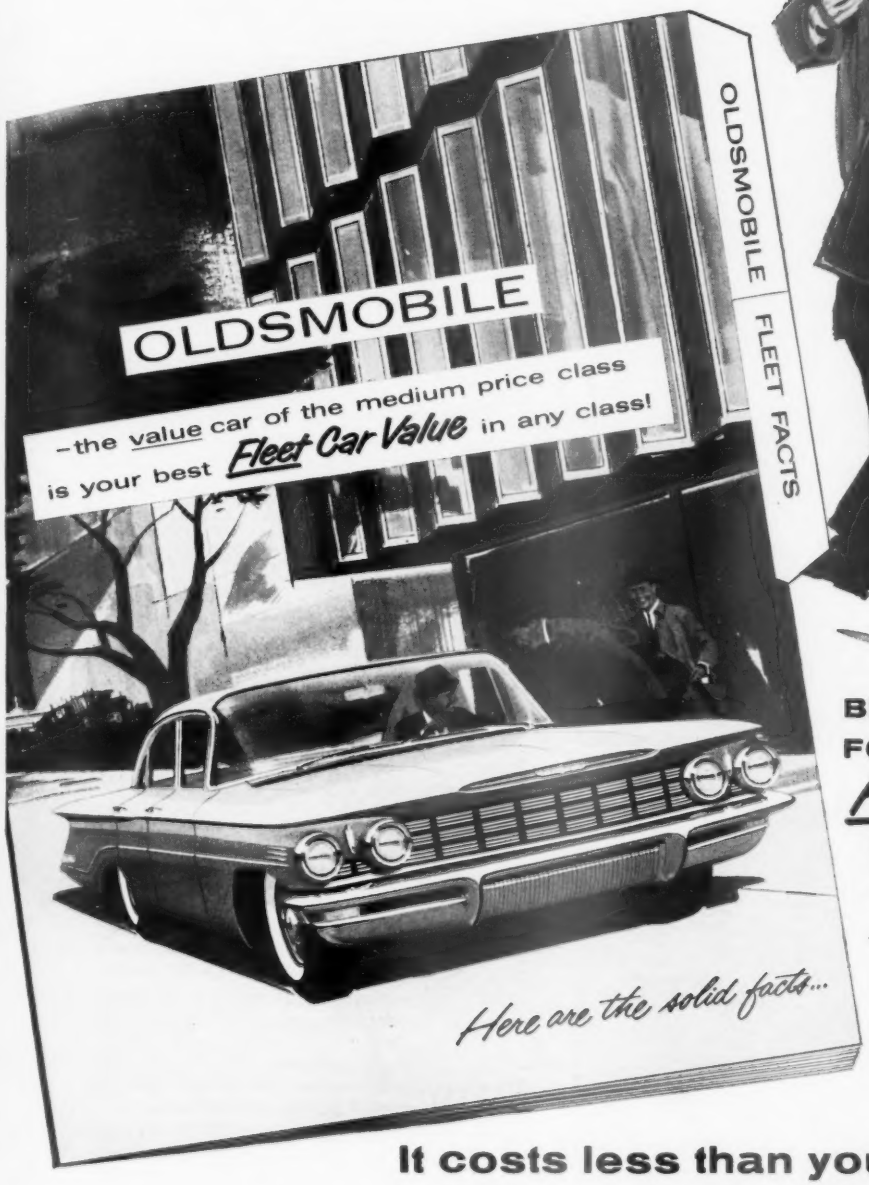
request.

76—(top) H. Grant 06—West- ant Comp- 162-163—

6, 1960

Get your key men out of the ordinary . . . into an OLDS!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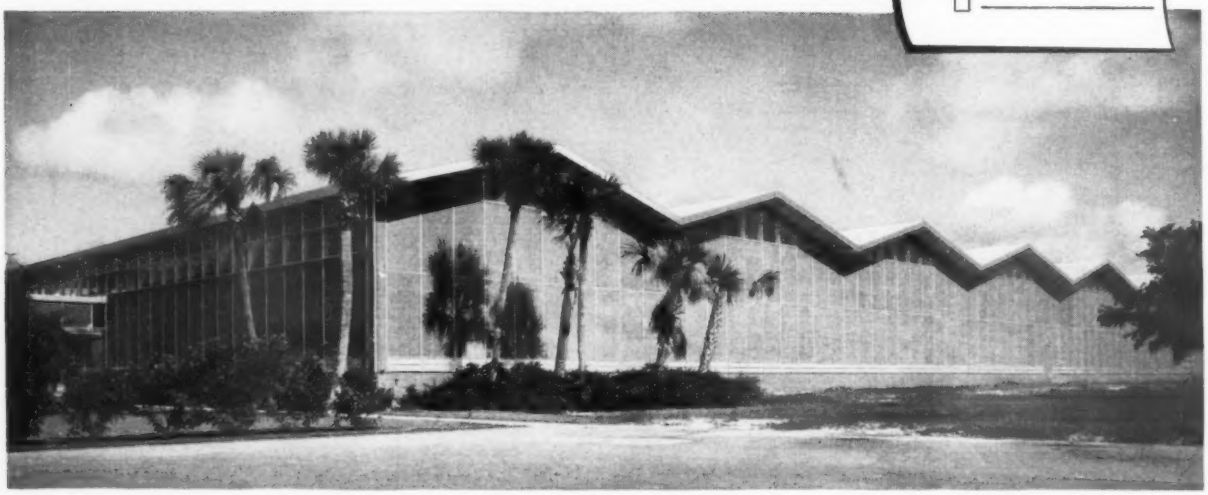
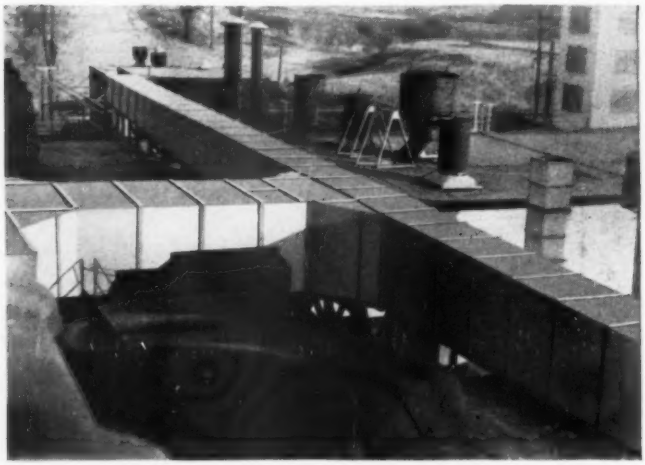


Fir plywood building components cut costs and speeded construction of this 50,000-sq.-ft. International Paper Co. plant, Auburndale, Fla. Giant plywood box girders support stressed skin roof panels, which incorporate ceiling, framing and roof decking. Panels are paired to form a peaked roof over each 40′ bay, providing large clear floor areas. Exterior walls are overlaid fir plywood, which needs no finish and virtually no maintenance. Construction with light, strong, prefabbed plywood components kept over-all costs to $7.54 psf. The entire structure was completed in only 154 working days.



Switch to plywood from lumber for pallets at West Coast Grocery Co., Tacoma, Wash., has greatly reduced repair and replacement costs. Plywood is smooth, splitproof, splinter-free; nails can't work loose. Easily damaged merchandise gets maximum protection.

Plywood ducts exposed to corrosive chemical wastes at this cellophane plant have required no maintenance in over four years. Exhaust manifolds remove air laden with sulfuric acid mist, hydrogen sulfide, other chemicals and water vapor. Plywood used is high density type, which has a smooth, hard surface, requires no paint or other protection, and is virtually impervious to moisture and most acids and other chemicals.

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READERS REPORT

Who Wants Nice Guys?

Dear Sir:

Re—Anti-Hawley letters [BW—Mar.12'60,p5].

Readers Oshin, Winston, and Barnet regrettably substantiate Author Hawley's concern over the direction corporate management is taking. . . .

The well-adjusted "nice guy" is unquestionably the backbone of professional management. But, by definition, he must be only average. Should he attempt to change the status quo, or in any way exercise his intellect beyond what is expected, he ceases to be a "nice guy." And, without such individualists, progress . . . grinds to a halt.

The strong individual cannot be sincerely well-liked, and he accepts this role. He cannot be all things to all men and get a job done.

Without question, the strong corporate executive is an authoritarian. He is demanding and a decision maker. He, necessarily, also has the courage to accept the responsibility for his decisions.

To have the right to be an authoritarian, within law, is one of the greatest assets of our democratic philosophy. Without this . . . right, we, as a country, would be no better than the forces that have opposed us. . . .

Hawley should be commended for his efforts in bringing this critical problem out of the personnel offices into the open arena of public opinion. Our nation's basic philosophy is being challenged by aptitude tests, self-perpetuation of "nice guys," and the concept of committee decision making. Individualism and intellectual freedom are being threatened. The older, strong managers of today had better take a hard look at the growing cult of mediocrity developing just below them in the middle management group. Their responsibility is not only to their firms, but to the American people and the democratic concept as well.

JOHN S. CARTER, JR.
PRESIDENT, SEACOAST DEVELOPMENT CORP.
NEEDHAM HEIGHTS, MASS.

Dear Sir:

. . . I . . . thought that the report of my Chicago American Management Assn. talk was very well handled [BW—Feb.20'60,p129]. The reaction comments that you used stand up very well indeed when judged against the great number

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that I have had since. I have been very much surprised at the general agreement that I have had from corporation officials. The disagreement appears to be largely concentrated in those whose ox has been gored—principally consulting firms.

CAMERON HAWLEY

LANCASTER, PA.

English Secretaries

Dear Sir:

"U. S. Bosses say English secretaries work harder, stay longer on the job" [BW—Mar.12'60,p82]. This is indeed an incendiary statement. Memo to above mentioned bosses: Let us hope that the "American executives who are almost standing in line to hire English secretaries" fare better in their experiences than some Chicago employers who employed domestics through another London agency. According to some very sad published experiences, . . . the main interest of the girls has not been "To work harder and stay on the job longer" but to get over to the U. S. where by some strange quirk of the law even the immigration authorities have no jurisdiction over them when they disappear to seek greener pastures.

Your recent article, although blood-pressure raising, was indeed enlightening. I was unaware that my skills were so much in demand that one had to go to England to obtain them.

MRS. FAY H. CAPONE

BLUE ISLAND, ILL.

Black Africa

Dear Sir:

Thank you for your excellent and timely article on Black Africa [BW—Feb.27'60,p84].

For emphasis and clarity, the Cameroon might have been indicated as one of the countries gaining independence in 1960 (as of Jan.)—"the year of Africa."

We find that some West Africans feel that giant UAC's (United Africa Co.) "Africanization" program is a bit late in coming—especially in comparison to efforts of some of the newer expatriot business firms.

Our country could greatly strengthen its bonds with Black Africa if President Eisenhower could find time to include a trip to Nigeria this fall when this most populous country in all of Africa will obtain its independence.

JOHN H. BRADNER

THE SUB-SAHARA CO.

NEW YORK, N. Y.

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FIRST NAVAL DISTRICT

IN REPLY REFER TO:

5720
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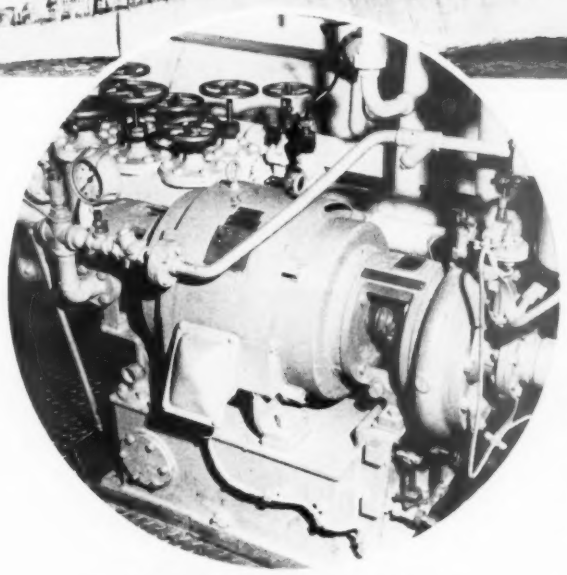
18 Dec 1959



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DOW

News about

MODERN BUILDING MATERIALS

Constructing new buildings today usually puts plenty of pressure on both the time and dollar departments. Architects and engineers are urgently asked to get the job rolling fast and to squeeze the maximum amount of building out of every budget. A new group of Dow plastic building materials, chemically engineered to solve particular problems, is helping do just that—without compromising quality. Take Styrofoam, for example . . .

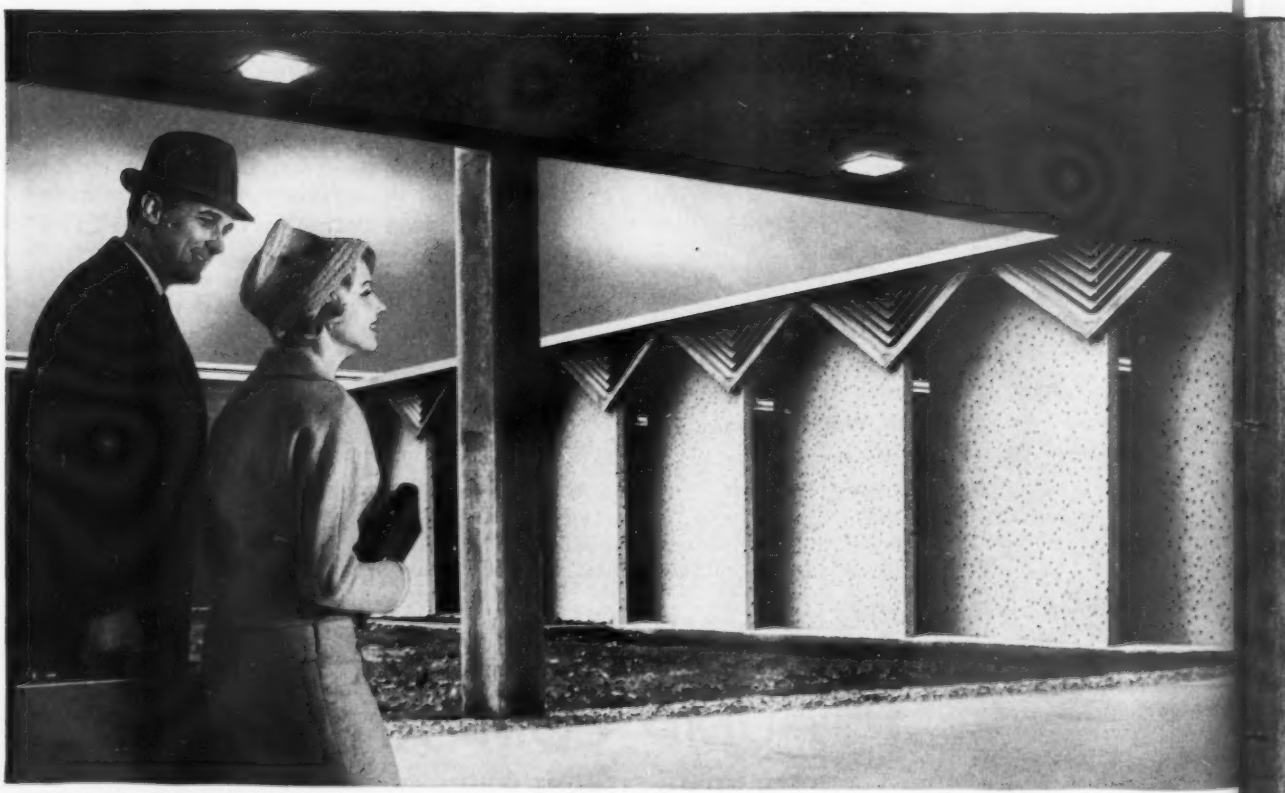
STYROFOAM® SPEEDS CONSTRUCTION, HELPS SIMPLIFY DESIGN, TOO!

Dow's rigid plastic foam insulates walls to assure the comfort of a warm, dry structure . . . also keeps cold storage areas at efficient low temperatures. It's STYROFOAM . . . one of several Dow Building Products that help provide more building for the dollar.

Styrofoam finds wide use as a combination insulation-plasterbase, for insulating masonry walls, and for maintaining temperatures in cold storage areas. Here are some of the cost-saving reasons for this wide acceptance . . . and why cost-conscious architects and designers keep finding more applications . . .

Styrofoam readily bonds to masonry or poured concrete with portland cement mortar—wood framing is eliminated. And where needed, a number of finishes may be applied directly to Styrofoam – again eliminating framework. Wet plaster, for example, adheres directly—or other finishes, such as wallboard or plywood, may be applied. Workmen find Styrofoam easy to handle because it is lightweight – cuts and shapes easily—positions effortlessly. Because water and water vapor do not

See "The Dow Hour of Great Mysteries" on NBC-TV



STUDENT UNION BUILDING, Southern Connecticut State College, New Haven, Conn. Architect: Carl R. Blanchard, Jr., A.I.A.

penetrate, insulating efficiency is permanent.

Below is the new Student Union Building at Southern Connecticut State College. Styrofoam was specified as the sole insulating material – for all cold storage spaces, for the unusually constructed exterior cavity walls and for foundation perimeters. In the walls, a plenum to service warm air ducts is formed by the cavity between inner and outer wall sections, with Styrofoam applied to the inside of the outer section. The use of Styrofoam eliminated the need for wood battens to hold insulation in place as required with other materials.

These other plastic building products developed by Dow are similarly helping to speed construction and slash costs:

SCORBORD® (patent applied for) is Dow's rigid plastic foam board, designed specifically for insulating around foundations and under floors. Made of expanded polystyrene, Scorbord is composed of millions of tiny, sealed air spaces that provide outstanding insulating effectiveness for the life of the building. Scorbord serves as its own water and water vapor barrier and, in addition, has a unique, pre-scored "snap-off" feature that reduces installation time and costs, because it requires almost no cutting or fitting–is installed rapidly in large sections.

Styrofoam insulation keeps cold storage facilities at efficient low temperatures in the new Southern Connecticut State College Union Building.

Styrofoam is easy to handle. Besides being lightweight, it cuts and shapes easily, positions effortlessly.

POLYFILM®, Dow's high-quality polyethylene film, is frequently used as a moisture barrier in foundations and as a curing blanket for concrete floor slabs. It also finds wide use in making temporary enclosures, necessary during construction.

SARALOY® 400 stretches roof life. A highly elastic and durable flashing material, Saraloy 400 can be fabricated right on the job to seal joints between roof and wall, roof and vent flues and to solve many other difficult flashing problems. Its exceptional pliability and elasticity permit it to conform with uneven surfaces, then expand and contract with materials to which it's joined, prolonging service life.

ROOFMATE* means real maintenance economy in roofs. This roof insulation is water resistant, eliminating the need for any additional water or vapor seal. Roofmate is lightweight, easy-to-install and bonds readily to roofing materials.

*TRADEMARK

• • • • • • • • •

DOW BUILDING PRODUCTS are profitably used in all types of buildings –factories, warehouses, office buildings, residences, as well as schools. For more information about any of these products, contact the nearby Dow sales office or write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Merchandising Dept. 1751AF3-26.

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MIDLAND, MICHIGAN

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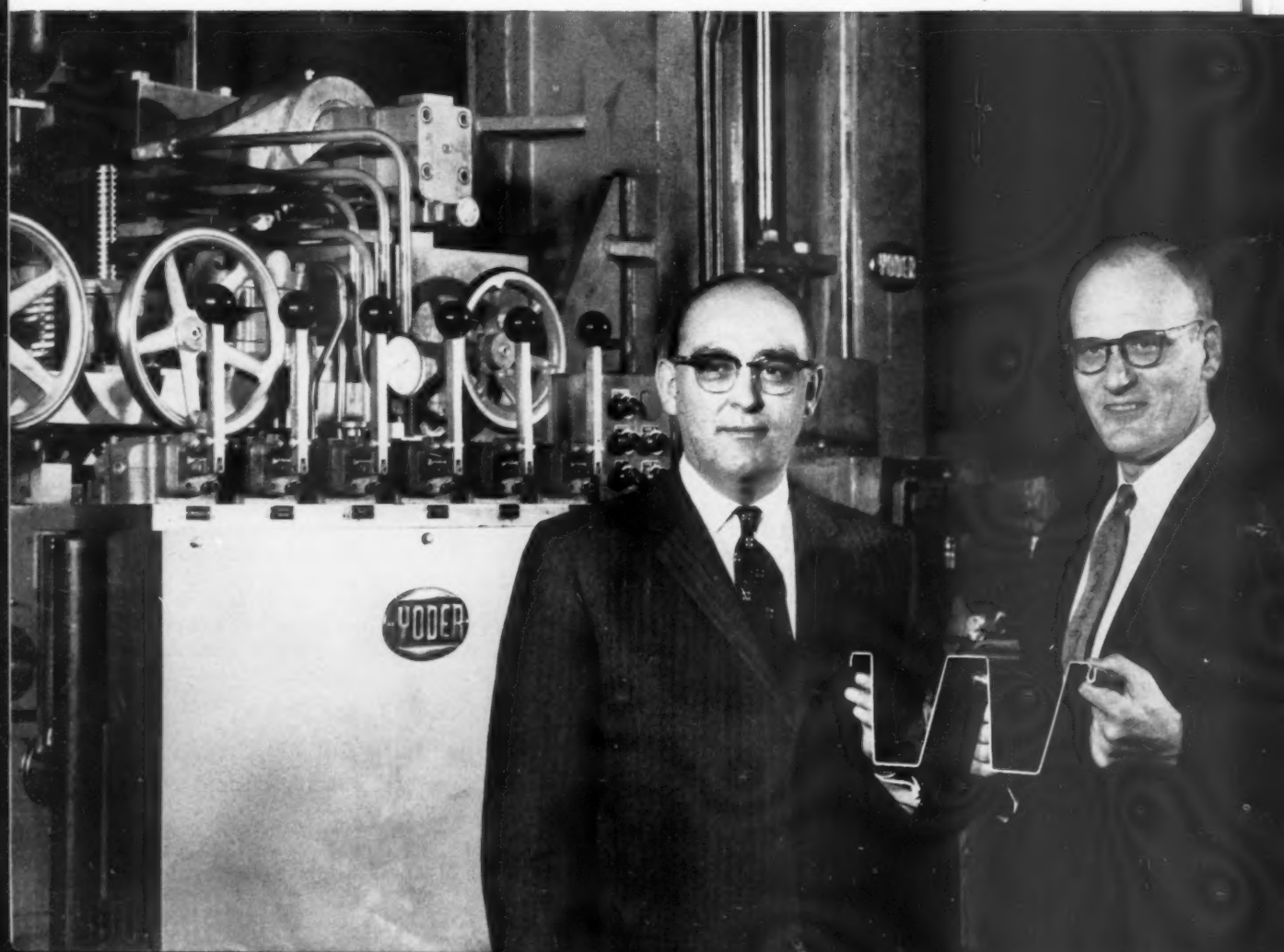
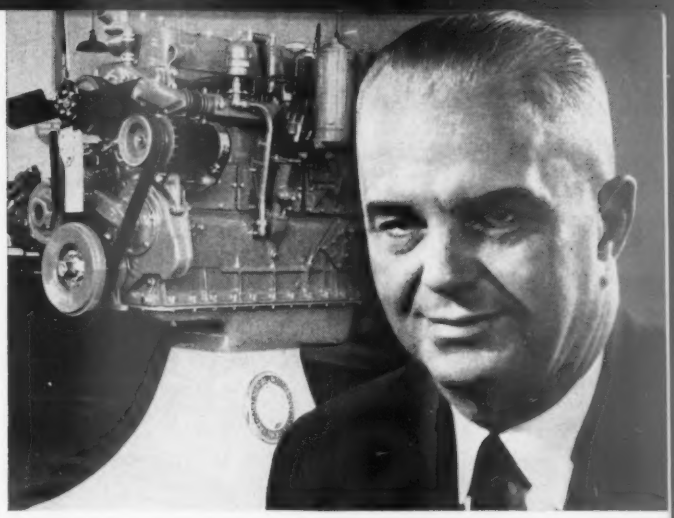
"FROM A STANDING START in gloomy 1934 we grew to our present $10 million annual volume, with Heller funds and guidance. With ample funds available, we devote our energies creatively to business." E. M. Stevens, President, Great Western Loan & Trust Company, San Antonio, Texas.

"HELLER FUNDS FUNCTION for us as equity capital. These funds replace stockholders; there's no lien on future profits. Our company started in 1949 with $4,500 capital. Today our sales exceed $30 million annually." E. T. Barwick, President, E. T. Barwick Mills, Atlanta, Georgia.

Six Typical American Success Stories-H





"WHEN NO OTHER financing institution was willing to consider us, Heller had confidence in us. Heller funds increased our profits, speeded our growth, helped us to financial independence." David Verson, President, Verson Allsteel Press Company, Chicago, Illinois.

"OUR MAJOR CUSTOMERS started making their own engines. We had to change products, find new markets. With Heller money and services our company weathered its stormiest period." C. J. Reese, President, Continental Motors Corporation, Detroit, Michigan.

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Heller has financed projects as diverse as jet planes and TV shows, oil tankers, ladies' wear and reclining chairs. But Heller will finance a company only if that company will profit more with Heller than by any other financing available. Today, Heller advances more than a billion dollars annually to business.

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"HELLER'S CASH gave us needed support at a critical period—and, maybe more important, though hard to measure, was Heller counsel. With Heller our sales have increased twenty-fold." Douglas O. Yoder (*right*), President, and Edmund H. Kanzenbach, Treasurer, The Yoder Company, Cleveland, Ohio.

"FROM A SMALL REGIONAL AIRLINE in Florida, Heller money helped National Airlines become one of the nation's leaders, a pioneer in jet travel." C. T. Baker, President and Chairman of the Board, National Airlines, New York, N. Y.

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HONEYWELL 800, LEADER OF
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New, simplified method of preparing EDP programs — at much lower cost — is developed for Honeywell 800 by Honeywell scientists

Until today, preparing a problem for a major data processing application cost many thousands of dollars. Sometimes it cost nearly as much as the equipment itself.

Now, Honeywell has developed a complete programming system which will make problem preparation for Honeywell 800 far more economical than for any comparable equipment. This unique system is called FACT (Fully Automatic Compiling Technique).

FACT is unique because it can be applied to *all* typical functions of business data processing with ease and uniformity. This includes input editing, sorting, processing of variable-length records and report writing.

Honeywell 800 users will now be able to state their data processing problems in simple business English. FACT will then translate these statements — *automatically* — into the machine language Honeywell 800 requires to do its job. Such simplicity explains why programming Honeywell 800 is so much easier than programming any other computer.

FACT represents a major advance in automatic programming. Added to the recognized ability of Honeywell 800 to process more data per dollar per working day, this development clearly indicates that Honeywell is stepping up the pace it is now setting for the data processing industry.

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5. You can interchange programs among Honeywell 800 installations

NOTE: FACT language has been specified and Honeywell 800 customers are already using it to prepare their problems. FACT automatic programs are delivered with Honeywell 800 systems.

Honeywell invites you to compare FACT features with those of any other compiler. For a copy of the new 94-page manual, "FACT — a new business language," just write Minneapolis-Honeywell, Datamatic Division, Wellesley Hills 81, Massachusetts, or Honeywell Controls Limited, Toronto 17, Ontario.

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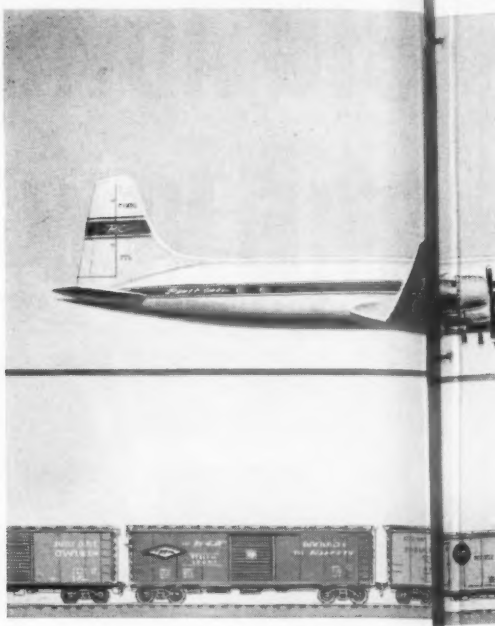

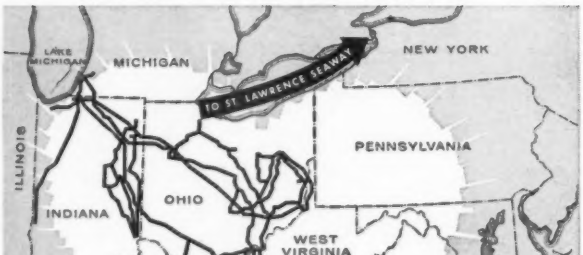

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The area is served by the Ohio River and the St. Lawrence Seaway. In addition, a network of railroads and more than 1000 miles of Interstate highways provide fast, direct access to nearby billion-dollar markets.

. . . and because American Electric combines the advantages of nearby coal supply with the most advanced power technology, you are assured of virtually unlimited, low-cost electric power.

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To firms whose profits depend on low-cost transportation —few areas offer so much as Northern Indiana and Western Ohio.

For this is the busy low-cost transportation belt that makes Detroit, Cleveland and Chicago virtually one vast market. It is a vital part of the direct, toll-highway route to New York and other Eastern markets. The area is served by numerous superhighways, a network of railway trunklines, the St. Lawrence Seaway and many air freight facilities.

In Northern Indiana and Western Ohio you'll also find

View of Howe-LaGrange Interchange on the Indiana Toll Road.

a wide variety of industrial resources—firms making most any semi-process product you'll ever need . . . firms that give you ready nearby outlets for the products you sell. You'll also find alert male and female labor from what is historically a friendly farm and smaller-town area.

Within this prosperous area in Northern Indiana-Western Ohio, American Electric Power System people can help you choose from a large selection of sites especially suited for plant location.

Plane, truck, boat, train—in Northern Indiana-Western Ohio every form of transportation brings you within hours of billion-dollar markets.

This 7-state information center can help you find that one most profitable location

AT NO COST and with substantial savings in valuable executive time . . . AEP area development specialists can give you the pertinent information you need to solve your plant-location problem. No other agency offers so thorough and intimate a knowledge of so large a territory.

To keep this information complete and up-to-date, a large network of the system's managerial personnel report daily on the important business and social changes within the territory.

This means that this one source of plant-site information offers you more information . . . more objectively compiled . . . than you would get by going directly to any one or all of the 2371 communities served by the system.

After you have evaluated this plant-site information in terms of your requirements, AEP specialists will work with you and local officials in relating community service and growth plans to your needs . . . and the needs of your employees and their families.

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- ☐ Dorman M. Miller (Virginia & West Va.) Appalachian Power Co., 40 Franklin Rd., Roanoke, Va.
- ☐ Herman G. Steegman, Indiana & Michigan Electric Co. 2101 Spy Run Avenue, Fort Wayne, Ind.
- ☐ Robert L. Wolf, Ohio Power Co. 301-315 Cleveland Ave., S.W., Canton, O.
- ☐ Rufus P. Thomas, Kentucky Power Co. 15th St. and Carter Avenue, Ashland, Ky.
- ☐ J. E. Wright, Kingsport Utilities, Inc. 422 Broad St., Kingsport, Tenn.
- ☐ R. R. Jewell *(Wheeling area only)*, Wheeling Electric Co. 51 Sixteenth St., Wheeling, W. Va.

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Advance Progress Report

CF&I-Wickwire develops DOUBLE

New wire drawing technique gives you longer-lasting wire rope

CF&I-Wickwire's premium wire rope – Double Gray – has now been improved by a remarkable new wire drawing technique. This new wire rope – Double Gray-X – provides EXTRA LONG LIFE.

Wickwire's advanced wire drawing process is the joint effort of our research engineers, metallurgists and key production people. They sought to reduce the friction between the wires within the rope itself, thus producing a wire rope with greater resistance to bending fatigue. An important step in Wickwire's new wire drawing process is the use of *molybdenum disulphide.*

"Moly Disulphide" builds a thin, permanent molecular shield around each wire. Coupled with Wickwire's other advanced wire processing techniques, it gives these results:

- *Friction-free interaction of the individual wires in every strand of Double Gray-X* – A molecular jacket of Moly Disulphide on each wire helps cushion them against the effects of bending, crushing and abrasion. As the rope operates over sheaves, for example, the molecular shield tends to prevent the wire surfaces from grinding against each other, reducing friction and wear.

a superior wire rope

GRAY-X

- *Smoother surface to the wires*—In any wire, tiny imperfections occasionally form on the surface. These "weak links" can cause premature breaking of the wires and impair the life of the rope. Moly Disulphide helps eliminate any minute nicks, creating smoother-surfaced wires.
- *Higher degree of toughness which is essential to longer wire rope life*—Moly Disulphide greatly minimizes the friction involved in the drawing operation, thus preventing the wires from "heating up". This assures the correct physical properties for every wire in Double Gray-X and helps the wire retain its original toughness.

Double Gray-X will be made in a wide range of sizes and constructions to give greater operating economy and reduced downtime for all types of rope-using equipment. It will be available soon from CF&I-Wickwire's chain of warehouses and through a network of nationwide distributors.

EXTRA STRENGTH

In addition to longer life, Double Gray-X gives you the extra strength of Double Gray Wire Rope. Made of extra improved plow steel with an Independent Wire Rope Core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

7484

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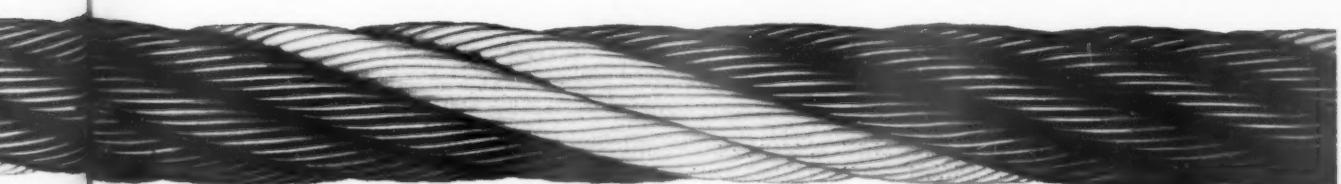
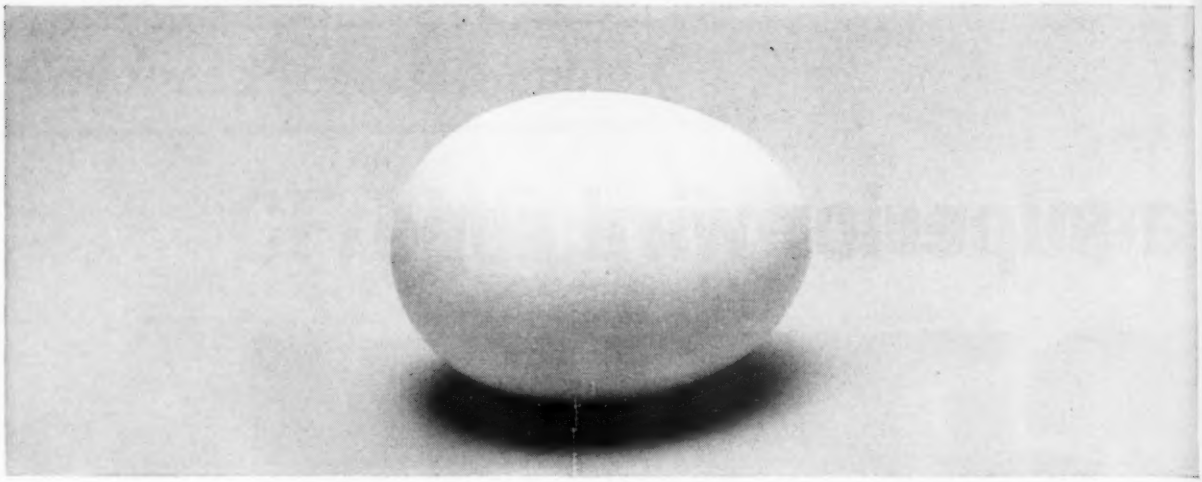
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia





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BUSINESS OUTLOOK

BUSINESS WEEK
MAR. 26, 1960

Credit showed new signs of easiness at several points this week.

This came at a time when business was showing symptoms of **needing a little moral support if not outright stimulation** (page 23).

Quite aside from improvement in the market for **government securities** (and the cost of short-term borrowing is down about 1½% from two months ago), there were **interest rate reductions** elsewhere this week:

- **Corporations that rely on commercial paper** for temporary funds saw the cost cheapened by ⅛% to ⅜% at midweek.
- **Savings and loan associations** in several areas were promised advances from the Home Loan Bank Board at ½% less after Apr. 1.

Lower interest rates do not, in and of themselves, create better business. (It takes an interested borrower as well as a willing lender to complete a loan.) Nor do momentary bobbles in short-term money rates guarantee an about-face in the official credit policy.

Nevertheless, **there's some psychological support in all this,** particularly in view of known Federal Reserve thinking (BW—Mar.12'60,p23).

—•—

How much help housing needs (or should be given) is a subject of widespread debate at the present time.

In any event, the Home Loan Bank's action implies a more liberal official policy. By cutting its rate on advances, it indicates **a willingness to make more money available to the S&L's for mortgage lending.**

It should be noted, though, that the S&L's go in mainly for conventional mortgages. The Home Loan Bank action thus provides little support for the popular, low-rate federally guaranteed mortgages.

—•—

Keep an eye on **cross-currents in the production trends.** Here's one that may be the key to 1960 business prospects:

Even though the Federal Reserve Board's **index of over-all production** was marked **down** a point in February from the January high (and the January high was revised downward a point from the preliminary figure), the **index for machinery output** continues to point **upward.**

It is quite true that many **producers of various types of machinery report new orders a little spotty** at the present time.

This can hardly remain true very long, however, if outlays for **new plant and equipment** go to a new high by late 1960—as businessmen say they will in their reports to the Securities & Exchange Commission and the Dept. of Commerce (BW—Mar.12'60,p28).

There's a considerable body of business analysts who **refuse to worry about the general outlook when capital outlays point so strongly upward.**

Machinery output set new highs in December and January while another top is indicated in the preliminary Federal Reserve index for February.

The output rate already is at a figure 10% higher than the 1957 average (and business outlays for new plant and equipment were at their largest, up to now, in 1957). Moreover, machinery production currently is nearly 17% higher than at this time last year.

—•—

The **oil industry** has a costly whodunit on its hands: It's trying to solve the mystery of **who's spoiling this year's petroleum market.**

Mild weather earlier in the winter was easy to spot as the villain—for a while. But **repeated storms** over much of the country in March helped confuse the case as excess stocks of **heating oils** were burned up.

And now another twist: That same bad weather in March kept cars off **the road, causing a record backup of gasoline** in storage.

Oversupply could be cured fairly quickly if refiners would cut back resolutely (though the effect on crude oil prices might not be happy). Overall, refinery throughput hasn't been reduced nearly enough so far this year to put a real dent in storage stocks.

Many refineries, to be sure, show figures attesting that they're doing their part. So the blame has to be on "the other fellow."

The same recriminations are being heard in crude production.

Texas is reducing April allowables to the equivalent of nine days' flow. At the same time, the state's regulators feel Texas wells are being made the sucker as **other states increase** their share of the market.

But is the real culprit hidden even more cleverly? The Chase Manhattan Bank's oil letter points a finger at **natural gas.**

The growth in oil's heating market has dwindled to about 1% a year while gas has increased its share by leaps and bounds.

—•—

Weather may just be an easy excuse for some industries not coming up to earlier expectations. But many **lines closely associated with construction** hold it responsible for their troubles in a very real way.

• **Lumber** prices have continued to give ground, while producers of **cement** in some areas are falling behind year-ago figures.

• Producers of **construction machinery** also figure the weather is to blame where they aren't booking orders they had counted on.

—•—

A further sag in steel production was clearly signaled this week.

Several open hearths were being taken off in the Pittsburgh area while a high-cost blast furnace and uneconomic ore output was cut off.

—•—

Not all **prices** are drifting sideways, even in this "noninflationary" year. You saw **acetate yarns** marked up this week, and there also were advances on **kraft paper** and multiwall bags made from kraft.

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If you are now leasing—or thinking about leasing one car or a fleet—you should talk with your CARS Rental System dealer. He is part of America's largest network of new car dealers who lease and rent cars—yet because he is a local businessman, your individual transportation needs are his greatest concern.

Your local CARS dealer has hundreds of associates, across the country, and their total investment in their businesses is more than $25,000,000.00! He, like his CARS associates, will lease any make or model new car you select—*plus* providing complete insurance coverage and factory-trained maintenance skills at low monthly rates that add up to worthwhile savings.

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Or, fill out the coupon below.

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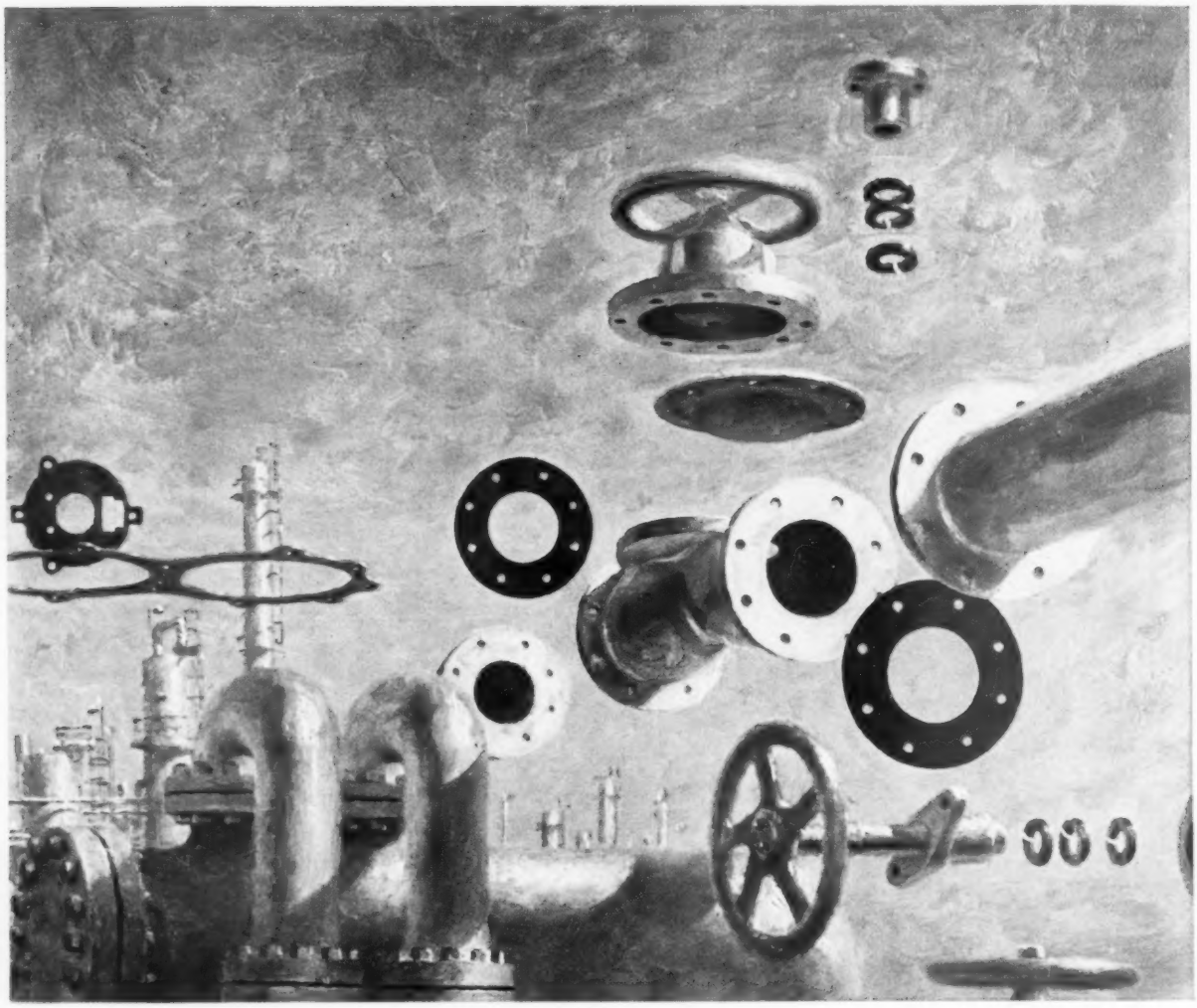
CLIP AND MAIL TODAY!

Industry's use of packings and gasket materials—two of R/M's many diverse products—is visualized by artist Nicholas Solovioff.



Wherever liquids or gases flow, mechanical packings and gasket materials are essential. And while these seals sometimes appear commonplace, producing them is an art. They must yield plastically, but only so much. They must, in various applications, resist heat, cold, pressure, moisture and corrosive attack—without deteriorating. To create packings capable of enduring such environments, R/M draws on broad experience in four major product areas—asbestos, rubber, sintered metal and engineered plastics. Whatever your business, if you have a problem involving the use of these materials—for any type of application—call on R/M for assistance in finding a practical solution. Raybestos-Manhattan, Inc., Passaic, N.J.

RAYBESTOS-MANHATTAN, INC.

SPECIALISTS IN ASBESTOS, RUBBER, SINTERED METAL, ENGINEERED PLASTICS

R/M

BUSINESS WEEK

MARCH 26, 1960

NUMBER 1595

What's Wrong With Business?

● By almost any statistical measure, business is good now. And profits are high.

● Yet there's a persistent uneasiness among businessmen. The stock market keeps sagging. And there's little zip to promise future growth.

● These are not the signs of imminent recession. They are the marks of a fundamentally changed business climate.

● The era of inflation and automatic growth is over. A new one, with new problems, is emerging.

The state of business at the end of 1960's first quarter is one of puzzlement, a degree of worry, of uncertainty—all in the midst of prosperity.

Gross national product has edged up almost to the $500-billion mark—nearly $20-billion higher than the last quarter of 1959. But nobody is taking much cheer from that all-time record high. The weather is persistently awful. At midweek, snow was falling on much of the nation—coating the roofs and windows of hundreds of thousands of 1960-model cars parked on dealers' lots.

• **Steel's Switch**—Since the turn of the year there has been a dramatic shift in business expectations and mood. In December, steel producers had said "there has never been a time when it appeared so easy to predict the outlook" (BW—Dec.26'59,p23)—and what they predicted was a 130-million-ton year, with output running at better than 95% of capacity all through the first half. This week steelmen said they were already cutting production below the 90% mark.

They did this because new orders and backlogs seem to be trailing off. In January, new orders for steel dropped over $400-million. And, judging from production schedules, they haven't been improving.

The slide in new orders wasn't limited to steel. New orders for all durables were off $1-billion in January from the month before, and were running half a billion below current sales.

• **Signs of Weakness**—The man who set out to frighten himself to death could find plenty of data to do it with. The leading indicators of the National Bureau of Economic Research looked weak; said one indicator man, Harris Trust & Savings Bank's Beryl Sprinkel: "Failure of the leaders to snap back after the strike period suggests that the early indications of future difficulties are beginning to appear."

Interest rates dropped, even though the money supply, which had grown only ½ of 1% in 1959, dropped below year-ago levels.

And what has done more to frighten the timid than anything else has been the stock market. Through the weeks of 1960, the stock market has sunk deeper, persistently failing to find the strength to recover.

• . . . **And Signs of Strength**—Still, the business community has refused to panic. Most businessmen still think 1960 will be "a good year." Few any longer expect a boom, as so many apparently did a few months ago. But they pin their faith on these elements:

• Capital spending is slated to rise to a record $37-billion, a 14% jump (chart, page 24).

• Inventory-sales ratios are still low, leave plenty of room for inventory growth.

• Consumer income is at record levels, and can support heavier buying.

• Consumers have not been using their credit in the past few months, have the credit available any time they can be induced to want it.

• State and local government spending is going up.

• Housebuilding seems sure to increase, as interest rates decline and money becomes more available (BW—Mar.19'60,p23).

• The abnormally bad weather can't last forever.

• **No Bounce**—But none of these brighter thoughts, nor all of them together, seems quite enough to restore to business that bouncy confidence that marked the weeks just after the steel strike ended. There's a widening sensation that, somehow, something has gone wrong, that the soaring Sixties don't seem to have much soar in them.

Whatever it is that has gone wrong, if something has, is clearly no threat for the months immediately ahead. If business activity shows no signs of shooting upward, it is obviously a long way from anything that looks like recession. Simply, the business curves are in a tangled sideways movement.

• **Change of Climate**—That's not a comfortable condition for a businessman. For most of the postwar period, the business climate has been one of unmistakable upward movements interrupted by clear-cut breaks.

That phase has been nearing its end for several years. Now, as the calendar slides into a new decade, the change is out where no one can miss it. Business is operating in a new and still nameless era—one in which the economy is growing a different set of basic problems, and the conditions for doing business begin to shift.

Pres. Eisenhower's chief economic adviser, Raymond J. Saulnier, sums it up in these words: "You feel as though you are in a dark room—one in which somebody has moved the furniture around."

I. Adjusting to a New Era

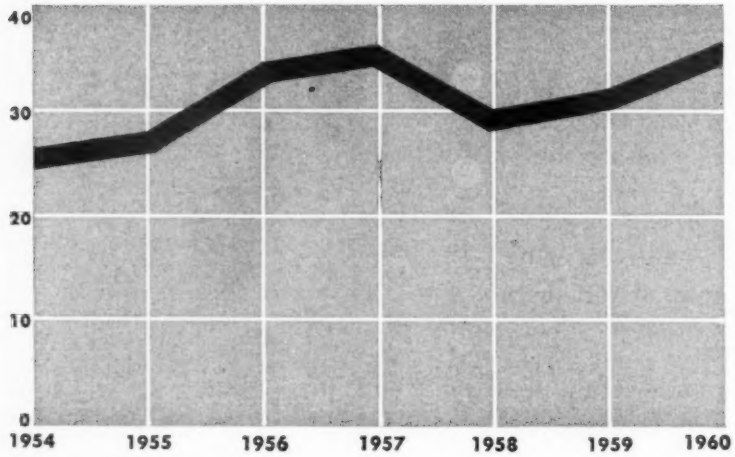
The remarkable thing about 1960 is that certain long-range problems—which observers have seen on the horizon—are turning out to be short-run and immediate problems.

These are the problems of a period that is no longer a postwar period. In the period we've been through, there were enormous jobs of reconstruction of war-damaged countries to be done; and it was the U.S. economy that was in a position to supply the goods that were in such short supply elsewhere.

This country had plenty of backlogs to make up—accumulated not just in the war period but in the long Depression. The U.S. was becoming a nation

THE IMMEDIATE PICTURE

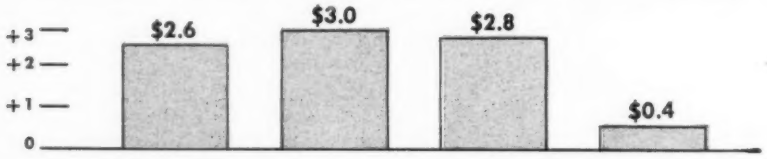
Capital Spending
(Billions of Dollars)



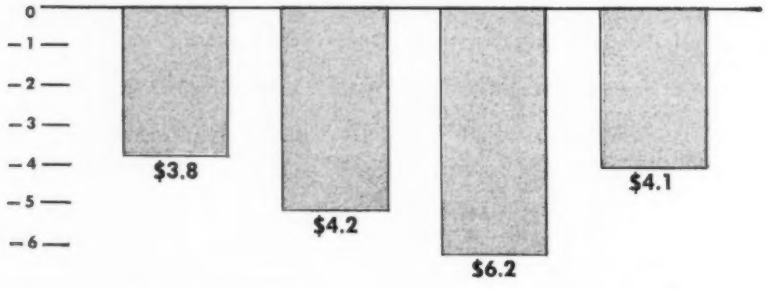
Data: Dept. of Commerce.

Balance of Payments
(Billions of Dollars)

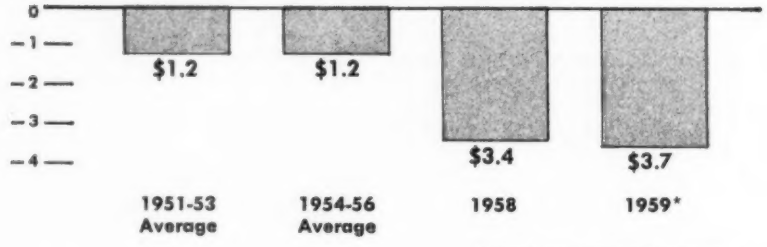
These surpluses on trade in goods and services . . .



Minus net outflow of U.S. grants and capital . . .



Have left these deficits in over-all U.S. payments



Data: Dept. of Commerce.

*Annual rate, seasonally adjusted, of first three quarters

of homeowners—of middle-class suburbanites. And there was an enormous hangover of liquid assets from the war, and an enormously expanded money supply, built on World War II debt. The U.S. fed the world not only vast quantities of materials and foods and skills—but also money. The money came out of the adjustment of a lopsided U.S. gold reserve and balance of payments position.

• **Feeling the Pangs**—Now that period has come to an end. Easy-going and inflationary expansion is past, and we are in a period of adjustment to a new era in which the international balance of payments imposes discipline even on this country—an era of intense competition among the industrial nations.

Business is feeling the pangs of that adjustment now. The business curve has flattened out. The reasons for this go beyond the superficial—beyond any sudden wrench in expectations (business has persistently refused to get alarmed about the stock market, as one BUSINESS WEEK survey after another showed in past months)—and beyond external political events.

But though 1960's strength rests on a rising tide of business investment, the underlying problems resulting from adjustment to the new state of the U.S. and the world economy promise to persist for years.

II. U.S. and World Economy

This adjustment is especially hard on the U.S. right now because the burden of armaments and aid programs is spread unevenly among the free world's industrial nations. For years, the U.S.—and other nations—have assumed that this country had some built-in superiority in productivity which enabled it to deluge other countries with its goods, and which bred a chronic "dollar shortage" which the U.S. sought to correct by aid programs.

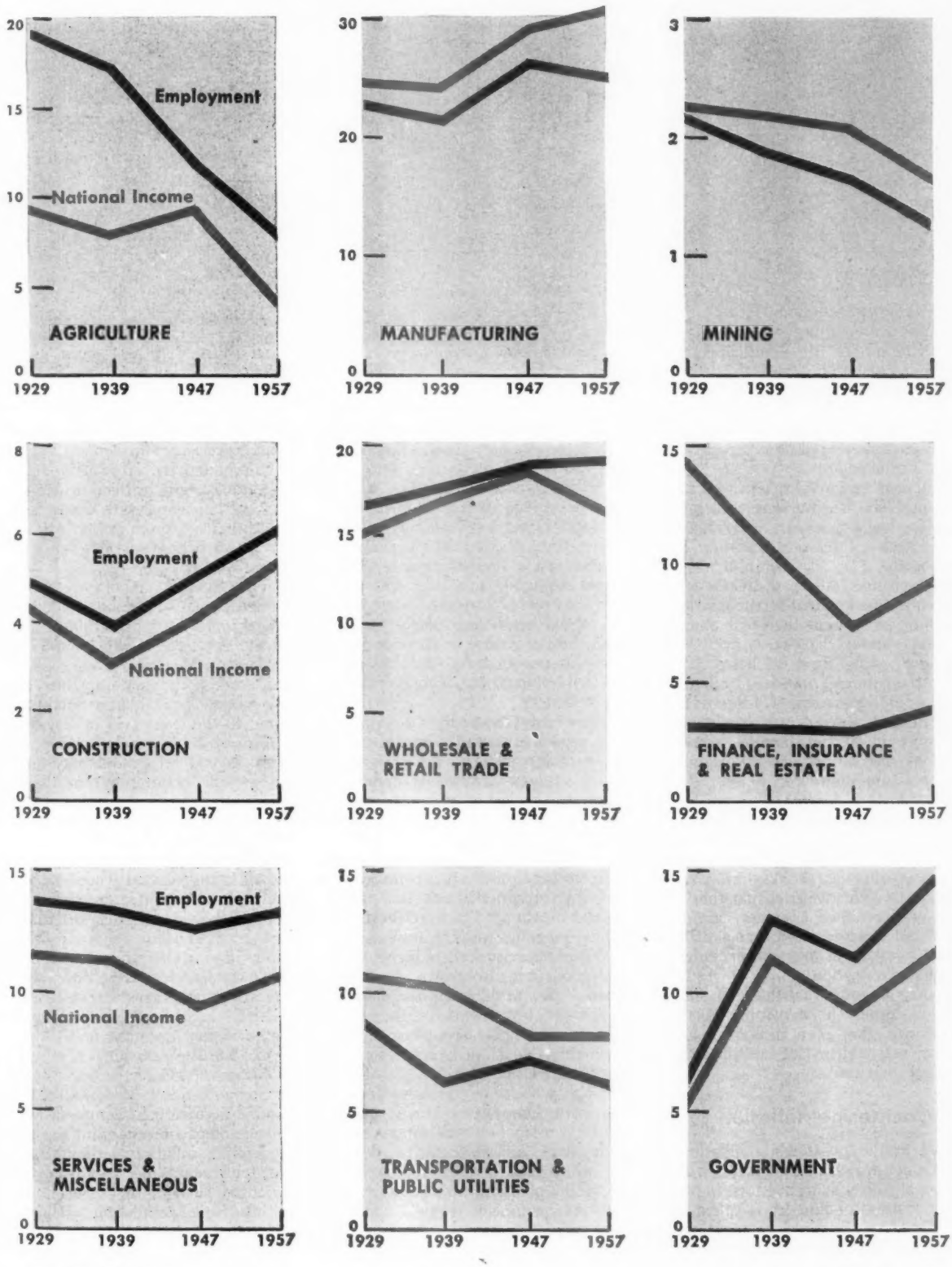
In the past two years (chart, left), the U.S. has been shocked to find that the dollar shortage is rapidly becoming a dollar glut. After running balance-of-payments deficits averaging little more than $1-billion a year from 1950 through 1956 (there was a small surplus in 1957, owing to Suez), the U.S. in 1958 suddenly found out what it was like to be in balance of payments trouble. That year the U.S. ran a $3.4-billion deficit. Foreigners claimed $2.9-billion worth of it in gold; for the remainder they increased their dollar holdings.

• **Old Fear Revived**—This revived an old, almost forgotten fear—the fear that large-scale conversion of reserves and other liquid assets by foreigners could subject a nation to intense deflationary pressure, could threaten—in the case of a key currency such as the dollar—to

THE LONG-RANGE SHIFTS

Share of National Income and Employment by Industries

(Percent)



Data: Dept. of Commerce.

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topple the international financial structure (BW–Sep.26'59,p118).

The necessity of preventing gold from gushing out of New York provided an extra impetus to the Federal Reserve's and the Administration's determination to fight inflation. High interest rates generally induce foreigners to leave their foreign exchange holdings where they are.

Deficits of the size we incurred in 1958 and 1959 cannot be long sustained. And the trend is not hopeful; says Edward M. Bernstein, formerly research director of the International Monetary Fund: "The reserve position of the U.S. has been deteriorating for a number of years and there is no indication that the situation will be reversed in the near future."

The 1959 data point up the worsening of the U.S. position.

• **Finding a Solution**—Thus far the Administration (and such groups as the Committee for Economic Development) hope to deal with the problem, not by cutting imports, but by boosting exports (page 134), by getting foreigners to assume a heavier military and foreign aid burden, and by a strong anti-inflationary policy.

But not every informed student of the problem is confident these measures are likely to work. Says Theodore O. Yntema, treasurer of the Ford Motor Co.: ". . . It seems to me that our exchange rates are incompatible with the fundamental relation between costs of production here and abroad." Yntema thinks that we've been lucky to get by as lightly as we have.

In the future, Yntema and others believe, cost disparities will be felt increasingly as foreign capacities expand, as more U.S. knowhow is exported, and as marketing and procurement channels are improved.

• **Devaluation Ahead?**—The real heart of the U.S. balance of payments problem, these men think, is the spectacular recovery and productivity advances of the economies of Western Europe and Japan. They suspect that the U.S. has an overvalued currency, an overbuilt cost structure, and that palliatives won't forestall for long the necessity of a major devaluation.

Others consider that the U.S. simply cannot devalue in any situation short of a crisis—that even rumors of a devaluation would in fact be sufficient to produce that crisis.

III. Countering Inflation

Just at the point when inflationary psychology was gripping the stock market last year—when investors big and small were all telling each other that the U.S. was facing permanent inflation, and investing in equities was the only way to beat it—the inflation threat waned. In part, this was due to intensified foreign competition. It was also due to a restrictive budget and fiscal policy, to tight money, and to the brimming capacity of U.S. industry.

The financial community may have overdone its reaction to the deflationary implications of the President's budget message. Nevertheless, that forecast of a small budget surplus in the current fiscal year and a $4-billion surplus in the next (or $6-billion in the cash budget, which includes all funds flowing in and out of the federal government) represented a great switch from the $12.4-billion deficit of fiscal 1959. And that switch did help to destroy inflationary psychology. Already higher Social Security contributions are cutting disposable incomes at an annual rate of $1-billion.

• **Lessening Squeeze**—More ample U.S. productive capacity has militated against inflationary pressure in two ways: by holding down a splurge of investment aimed at expanding capacity and by making it possible to produce and sell at current sales levels while maintaining lighter inventories. The high cost of money has caused companies to run relatively light on inventories, and to try to force their suppliers to carry inventories for them. This, in itself, reduces aggregate inventory requirements, since a central supplier can carry smaller stocks than a number of users would require separately.

If the job of carrying inventories is forced all the way back on the manufacturer, he can reduce inventories further—by planning to meet schedules out of shifts in output, rather than by carrying inventory.

• **Plenty of Goods**—But it's not just U.S. capacity that has expanded. So has the capacity of foreigners. World capacity in raw materials is more than adequate, thanks to past investment and new substitute materials; the supply situation is more than ample in coal, oil, copper, iron ore, rubber, coffee, tin, lead, zinc, and most other commodities. And the realization that stocks are ample and inflationary pressures negligible, reduces demands for inventories further.

World capacity for producing industrial goods has also grown greatly, because of the world boom in plant and equipment investment in the 1950s. Most countries now have plenty of steel, machinery, machine tools, fertilizer plants, chemicals. There's more capacity—though probably not enough—for plastics, petrochemicals, synthetic rubber, autos, construction machinery, man-made fibers, pharmaceuticals. Earlier, the world had looked to the U.S. for many of these things; now they not only compete strongly with us in foreign markets—but they mean intense price competition for U.S. products in our own market.

While fiscal policy, monetary policy, ample U.S. and world capacity, and intensified competition have been holding the U.S. price structure in check, wages have been rising. This promises to put more pressure on profit margins.

IV. Changes in Industry

First-quarter profits this year are bound to be good—though possibly a little smaller than business was counting on. But later on, it may turn out that first-quarter profits are the best 1960 will see. This is doubtless one of the stock market's big dampeners.

The demand for the output of U.S. industry in the home market seems to have relatively little real zip. To some extent, of course, this is the consequence of tight money and high taxes. But it also appears to result from the third basic force of change in the U.S. economy—the technological and structural shifts that have been going on among U.S. industries.

• **Employment Shifts**—The charts on page 25 describe these underlying industrial shifts. What they show is a complex maze of movements with some high-productivity, high-income-generating industry groups such as manufacturing getting along with fewer workers, and other low-productivity, low-income groups such as services taking on additional workers.

The Eckstein report to the Joint Congressional Economic Committee lays this shift to population problems—to the necessity of providing for more babies and more old people, relative to the working population, thus cutting the money spendable on durable goods—and to the rising cost of services.

This shift, the Eckstein report suggests, is bad for productivity and bad for growth—because by and large the expanding job opportunities are in the low-income service industries, not in the high-income industries such as auto manufacturing, steel, or mining. These are all losing workers who would much prefer to stay where they are, rather than work as dishwashers or handymen—at least at the wages available in those lines. Their reluctance to shift to lower-paid, lower-productivity jobs appears to be a major factor behind the relatively higher rates of prolonged unemployment these days.

• **Job for Business**—On all these key problems that have struck the U.S. economy in this new period of adjustment—international competition and balance of payments strain, the task of moderating inflation without inducing unemployment, and coping with the structural changes in the economy resulting from population change and technological progress—the U.S. has some tough policymaking ahead of it. And so has U.S. business.

DEBRIS of Northwest Airlines Electra litters field near Tell City, Ind. After wing broke off, fuselage plummeted to earth.

Speed Limit Slapped on Electras

All the Lockheed turboprops will have to fly slower until CAB finds out why two have come apart in midair.

The Federal Aviation Agency this week placed speed restrictions on the Lockheed Electra turboprop transport following the crash of a Northwest Airlines Electra near Tell City, Ind., in which 63 persons lost their lives (picture).

The restrictions, calling for a limit of 275 knots in normal cruising, were set because early investigation indicated the accident may have been caused by a structural break in the root of the left wing. In addition, the break appeared to be very similar to the wing failure found in the Braniff Airways Electra that crashed last September near Buffalo, Tex.

At midweek, there had been no overt move further to stiffen the restrictions. But FAA officials close to Administrator E. R. Quesada were not discounting the probability that the airplane would be temporarily grounded pending results of the accident investigation is being conducted by the Civil Aeronautics Board.

• **Buried Fuselage**—Somewhere in the disintegrated fuselage, embedded in a crater in the ground approximately 25 ft. in diameter and 40 ft. deep, probably lies the clue to the basic causes of the crash. When the wing broke off, the fuselage plunged from its altitude of 18,000 ft. and buried itself in the earth. It exploded, and then burned for several days.

Investigators hope that studies of the disintegrated fuselage will reveal the exact area where structural failure occurred. Then they can determine what structural modifications must be made to prevent future such failures.

• **Different Plunges**—CAB investigators decline to conjecture now on the reasons behind the crashes. Although the two accidents were similar, there were several differences that add to the mystery.

The Braniff plane's fuselage followed a bullet-like trajectory, dropping components and parts along the way; the Northwest fuselage plunged to the earth. One part of the Braniff plane was found 13,900 ft. from the main wreckage. The Braniff Electra wing apparently broke off at the wing root, while the wing on the Northwest plane appears to have cracked slightly out from the root.

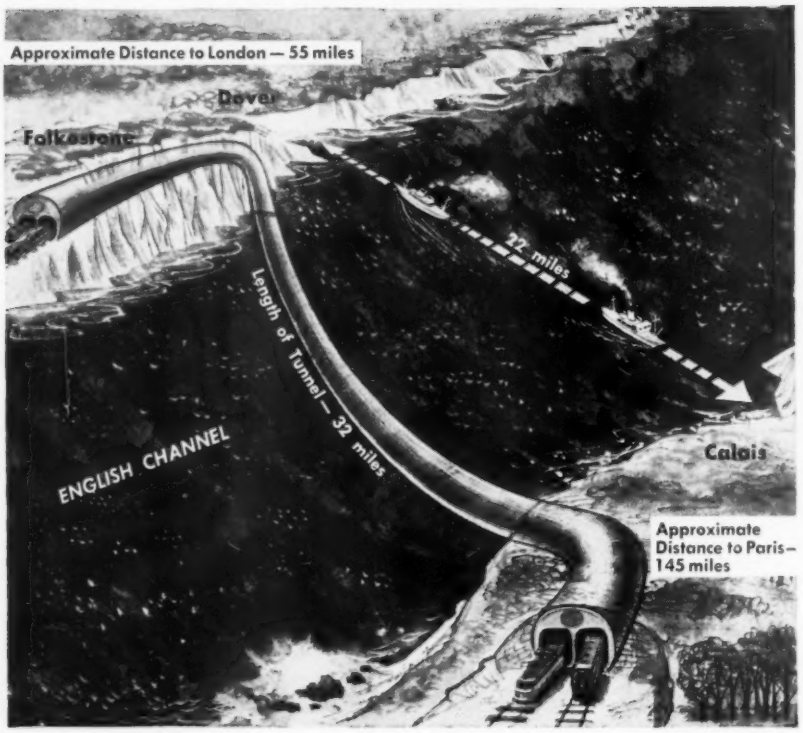
• **Special Huddle**—In an emergency attempt to probe into possible causes of the accident, Quesada called a special meeting last Tuesday of all operators of the aircraft, officials of Lockheed, and members of the CAB. No immediate results were announced, although Quesada said it was "constructive, helpful, and informative" and would "assist us materially in developing any appropriate action."

• **Three of a Kind**—The accident was the third fatal crash of an Electra since the airplane was first placed into domestic scheduled service Jan. 12, 1959, by Eastern Airlines. An American Airlines Electra crashed during a landing Feb. 3 at New York's LaGuardia Airport, 12 days after it had inaugurated service. Early investigation of this accident indicated that the pilot may have misread the altimeter during his approach to the runway. Five days after the crash, FAA imposed landing restrictions on any Electra equipped with the type of altimeter used on the American plane.

Minimum landing ceilings were increased to 1,000 ft. and minimum visibility to one mile during the day and two miles at night. When all carriers switched immediately from the new drum-type altimeter to the standard type, the FAA restrictions were lifted.

Speed restrictions apparently have not yet forced airlines to undertake any major scheduling changes. The new speed limit of 275 knots, compared to the original approved cruising speed of 324, will add about five minutes per hour to each Electra flight on American Airlines, a company spokesman said. Northwest estimates the time lag at only two minutes. Last week, FAA had not determined the exact air speed of the Northwest Electra at the time of its crash. Early studies suggest that the plane wasn't traveling faster than the new limit.

Eastern and American are flying the most Electras on short and medium-haul routes. There are 175 Electras either delivered or about to be delivered, with 137 in or ready for service. Seven airlines have the plane in service. Captial Airlines has five on order, and officials have made no move to change the delivery schedule.



At Last, a Channel Tunnel

Since the time of Napoleon, scores of engineers, traders, and soldiers have talked of tunneling under the English Channel to connect directly Britain with the Continent. Before the end of March, a Channel Tunnel Study Group, which has been exploring the practicality of a channel tunnel for almost three years, will report to the British and French governments. Its finding: A tunnel makes technical and economic sense.

The study group, which has U.S., British, and French partners, will report in detail the various possibilities for a $300-million tunnel with one end near Dover in Britain and the other near Calais, France (sketch). For financial reasons, it will favor a twin-tube railroad tunnel.

Construction of such a link will change, possibly profoundly, political and economic relationships in Europe. Britain, long in splendid isolation from the Continent, will have a close physical tie to the mainland. Moreover, a tunnel could help close the rift between the European Free Trade Assn., of which Britain is leader, and the European Economic Community, of which France is the most influential member.

• **Getting Practical**—Building the tunnel, by far the world's longest, will take some engineering derring-do and financial hustling. On both sides of the Atlantic, however, six major investment houses appear ready to underwrite a tunnel bond issue. Governmentally, the French have long favored the tunnel and the British, who had been holding out for military reasons, have now come around.

All in all, tunnel promoters are optimistic. Says one, "The project isn't a dream at all. We are shooting for 1961 as a target date to start construction."

• **U.S. Pushing**—Part of the project's impetus is coming from Technical Studies, Inc., of New York. The company is headed by Chmn. Arnaud de Vitry and Pres. Frank P. Davidson. They have brought in top U.S. construction companies, economic consultants, and Wall Street investment houses.

Technical Studies got into the venture in 1957, when the Suez Canal Co., having been put out of business in Egypt by Nasser, joined Channel Tunnel Co., Ltd., of Britain, to study the project. They were joined by a French channel tunnel outfit to form the Channel Tunnel Study Group. Each of the four partners now holds 25% interest.

• **Two Plans**—Through Technical Studies, the group got a consortium, including Morrison-Knudsen Co., Bechtel Corp., and Brown & Root, to look into possibilities of boring a tunnel. A plan to lower tubes of pre-cast concrete to the Channel bed came from another group, which includes Raymond International, Inc., Kaiser Engineers, and British and French firms.

Geologically, either plan is possible. Engineers could bore a tunnel or lay a tube on top of the chalk bed, of which the white cliffs of Dover are an outcrop, that runs continuously from Britain to France.

• **No Autos**—Either way, the tunnel probably won't carry autos and trucks, except on rail cars. Ventilation of exhaust fumes would be expensive, besides the danger of auto breakdowns, fires, and driver claustrophobia. Most likely, the report will recommend tunnels for specially designed electric trains, running at 70 to 80 mph. at a peak rate of 12 per hour.

These trains would haul covered double-decker flat cars carrying 300 cars a trip with passengers in their autos. Terminals with two-story platforms would speed loading and unloading.

Operating this way, the tunnel could handle 3,600 autos an hour. There would also be express passenger trains running from London to Paris in 4 hr. 20 min. This is competitive with air travel, when you add in the time it takes to get to and from airports in both cities. In addition, fast freight trains, it is estimated, would move 1.2-million tons of freight yearly.

Using an economic survey by a consortium of British, French, and U.S. traffic experts, the tunnel's planners have deliberately emphasized speed and large capacity. Travel between Britain and the Continent, now dependent on airways and channel ferries, is enormous. Last year, more than 325,000 autos and more than 3-million people traveled between France and England. If the project succeeds, it will undoubtedly cut into short-hop air travel and would probably sink the ferry service.

• **Financing**—While the engineering work was going on, the study group organized an underwriting syndicate to examine financial aspects of the project. The present lineup includes: in New York, Morgan Stanley & Co. and Dillon, Read & Co., Inc., and in Paris, Banque Rothschild and Banque de l'Union Parisien, and in London, Morgan Grenfel, and Philip Hill, Higginson, & Erlangers, Ltd.

Where this group will get the necessary funds is not clear yet. Says one member: "It partly depends on interest rates in Western capitals. If there's tight money in New York, obviously we'd raise as much money as possible in, say, London."

If the project is approved by the two governments, an international company, probably the present study group, will build and operate the tunnel. Each of the four partners will share in the tunnel's ownership, though to what extent hasn't been determined. So far, the study has cost about $2-million.

Pollsters Follow Business' Lead

● New 1960 breed of political poll-takers turns to tools of motivational research developed for business.

● Mostly they aim not just at forecasting but at laying down strategy guidelines for political clients.

● For 1960 they see Nixon and Kennedy running—neck and neck, with almost identical voter appeal.

There's a new breed of political poll-taker at work feeling the nation's Presidential pulse in the 1960 elections. The 1960 poll-takers have taken a leaf from business, and are reinforcing the traditional quantitative nose-counting and group-sampling with the newer tools of motivational research.

What they are doing, in fact, is carrying over into political prognostication the methods they have already successfully used in business research. For many of the 1960 poll-takers can cite a long string of corporate clients for whom they have studied everything from brand acceptance to employee relations. At least $500,000 is spent on this new form of research in a general election year, according to New York researcher Louis Harris, who does political work in addition to media and product studies.

As in most motivational research, the results of their political studies tend to be top secret. But a BUSINESS WEEK survey of their activities shows how they are applying the motivational approach to politics—and also yields some intriguing clues on the Presidential race itself.

• **Different**—These new poll-takers differ from their predecessors in a number of ways:

• They are subtler, more indirect. They won't take "don't know" for an answer. Indeed, they may not even ask for whom you will vote, preferring to interpret this from your attitudes.

• They usually remain in the background, avoiding the publicity created by syndicating straw vote results. They are working for particular candidates, for the political parties, or for other interested persons—clients who want the results for their own use only.

• Their findings are used more as strategic weapons in formulating campaigns, less merely as predictions. Their clients, of course, want to know who's losing and who's winning. But they're more interested in why, and in what can be done about it.

I. What Voters Look For

What has this new brand of poll-takers discovered about the voter—and about his probable 1960 behavior? To begin with, they have encountered widespread passivity and indifference. Says Barry Foster of Opinion Research Corp.—a Princeton organization that specializes in studies for management guidance and lists three dozen or more top U. S. corporations among its clients: "The politically concerned citizen is a very rare bird."

Dr. Sidney Levy of Social Research, Inc.—a Chicago group that takes its methods from the social sciences—reports one typical response. It came from a woman who, when asked her candidate preference, replied, "I'm not sure—could you give me a hint."

Almost without exception, the researchers note the similarity of behavior of Americans as citizens and as consumers. Marketing researcher Daniel Yankelovich—whose file includes a study of Japanese-American trade relations (BW—Sep.19'59,p150)—draws this comparison: "The average voter, lacking confidence in his ability to evaluate issues, chooses instead the candidate whose personality image inspires the most confidence. The consumer, unable to evaluate competing brands on their merit, falls back instead on the brand's image."

• **Paradox**—In their probing into what motivates voters to act as they do, the researchers came up with a paradox for the 1960 Presidential race. They were almost unanimous in finding that voters chose Presidents according to a very intangible but strongly held "image" of what kind of man should head the country. But in 1960, the images of the two men who loom largest in the voters' minds appear so identical that, in the end, these poll-takers expect "issues" rather than personality to shape the outcome.

Last week the public got its first feedback on its Presidential "image" in a Life magazine article based on one of the projects, one done by Yankelovich. It may have disturbed some students of civics to read that people thought of the ideal President in terms of rather vague personality traits—"a man of conviction . . . above partisan considerations . . . a man with a common touch . . . a vigorous, decisive man."

Other researchers, though, come up with similar results. A hitherto unpublished study made four years ago by Social Research turned up these key criteria for picking Presidents: "Friendliness and warmth—approachable in manner—should have convictions, but not so unrelentingly as to seem an 'angry man'—sincere, trustworthy—reasonably energetic in pursuing public goals."

• **Men and Images**—Does this suggest that winning elections is really just a matter of finding a candidate who best fits the Presidential image? Yes and no. It seems to depend on the man and the times. Eisenhower's image has hardly changed—he'd still be odds-on favorite of the qualitative researchers. Stevenson's, though now fainter, also remains the same.

But Nixon presents an image considerably altered from four years ago. In 1956, Social Research found Nixon appearing "a little immature, inexperienced in the really important affairs, maybe 'not quite above reproach.'" Today they find a warmer image—he stands out now as "honest, 'well-groomed' for the Presidency, friendlier."

• **Two-Horse Race**—Just about all the poll-takers agree in figuring 1960 as a two-horse race between Nixon and Kennedy.

Because Kennedy's and Nixon's images are remarkably alike, the researchers look for a very close contest between them—and that's why they expect the "issues" to decide. They don't see these issues as great public questions, and they see them as largely beyond the candidates' control. Nevertheless, they think the issues of foreign affairs and Catholicism will determine the outcome.

Nixon most clearly leads over Kennedy when people think of foreign affairs—but except in an international crisis they don't think much about foreign affairs. If such a crisis flared up near election time, the poll-takers figure Nixon's chances would greatly improve.

Kennedy's Catholicism can be both bane and boon to him. The researchers find that he will magnetize back to the Democrats the great bulk of the Catholic voters that Eisenhower lured away. Harris—who this year is working for Kennedy, though he has worked in the past for men of many factions—says Catholics, aware they have never had a President, are determined at some point to elect one of their faith; after that, the issue would not unite them. He finds most Protestants tolerant about electing non-Protestants. An exception: Lutherans and Baptists distrust non-Protestants.

Other researchers agree with his cur-

rent assessment, but note that an incident raising the question of church-state relations could quickly ignite the issue, and defeat Kennedy if the issue came up in a highly controversial form.

II. Changing Methods

The rise of academic political research and the introduction of qualitative techniques stems from the shifts in poll-taking forced by basic threats to its survival. Twice in its history, political research has had to change course radically to avoid distinction.

The first crisis arose in 1936, when the era of straw vote-taking met a sudden death in the now defunct Literary Digest's prediction of a Landon victory in that year of Roosevelt's greatest sweep. The new crop of syndicated polls based on scientific sampling techniques, by independent pollsters such as Gallup, Roper, and Crossley, met its setback in 1948, when most of them quit counting in October in the belief that Dewey was a shoo-in.

Then academic political researchers stepped in, showed that the pollsters were generally well within the tolerance set for commercial research. But in politics, if Brand A has just a tiny margin over Brand B, that margin makes all the difference.

• **Problem Areas**—The academicians isolated three problem areas—the straw voters who "don't know," those who change their minds, and those who stay home on Election Day. This led to qualitative techniques, as political researchers decided they not only had to find an accurate cross-section of the electorate, but also to find out what it was really thinking.

The qualitative researchers now think they can lick the "don't know" problem by careful probing, and can tag potential stay-at-homes and switchers not only by a recheck but by reviewing the course of the campaign in relation to previously measured attitudes.

• **Wide-Ranging**—It's these refinements that have attracted politicians and candidates as clients. They may advise on mayoralties or on state or Congressional primaries. They also pre-test candidates, advising an interested sponsor as to who will make the strongest showing. Harris says his work caused the anti-Chandler faction in Kentucky to revise its slate successfully in 1959.

The researchers prefer to have their studies used as strategy guides. But, says Opinion Research's Foster: "It doesn't matter how much we tell clients it's a market study—they think we should pick the winner." Credit is another hazard; a losing client is a poor risk. Most researchers now insist on cash—$6,000 to $8,000 for a typical three-times-in-a-campaign statewide survey—in advance.

Business Finds Jobs For Contemporary Art

"They're buying it right off the easels," said John Gordon, curator of New York's Whitney Museum, at the opening of the museum's current exhibit called Business Buys American Art (pictures). Gordon's quip isn't far off the mark, for almost all the 58 works on view—borrowed from 51 companies—are the kind of splattered canvases and nonrepresentational sculpture that now symbolizes most American artists.

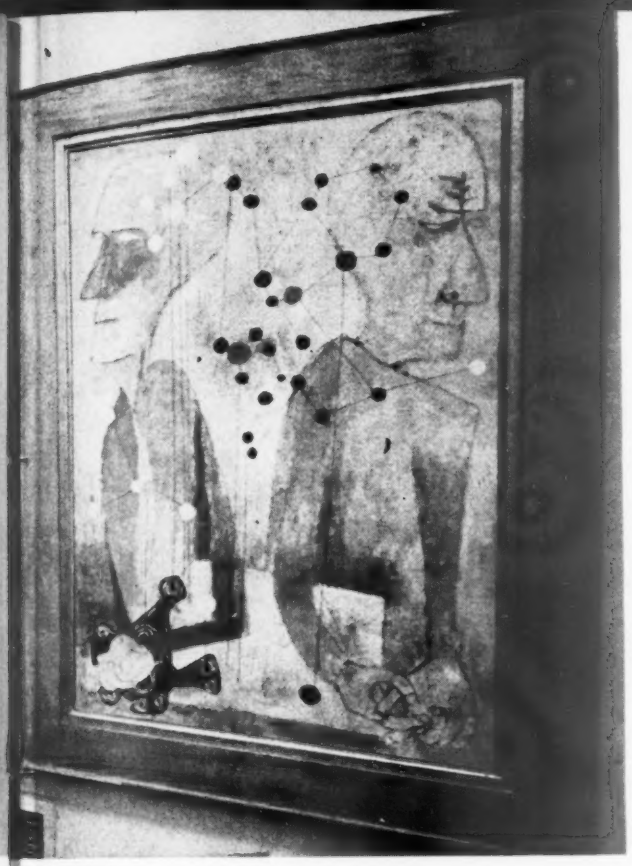
More important to the art world than the businessman's taste, however, is the upswing in the quantity of company art purchases that the Whitney exhibit points up. This trend showed up last fall when Whitney ran a nationwide survey to find out what was available for the show. Of the 225 replies, 109 companies reported that they owned 20th Century American art works, a total of 325 items—most of it acquired in the past few years.

Contributors to the show include Abbott Laboratories, Aluminum Co. of America, Chase Manhattan Bank, Connecticut General Life Insurance Co., Hawaiian Pineapple Co., General Electric Co., General Motors Co., Hallmark Cards, Inc.

Included in the display are sculptures by Seymour Lipton, Isamu Noguchi, Richard Stankiewicz; and paintings by James Brooks, Charles Sheeler, and Adolph Gottlieb. Young and unknown artists also are represented. Apparently many executives gamble on the chance that the painting they buy for a few hundred dollars today may be worth thousands in 10 years.

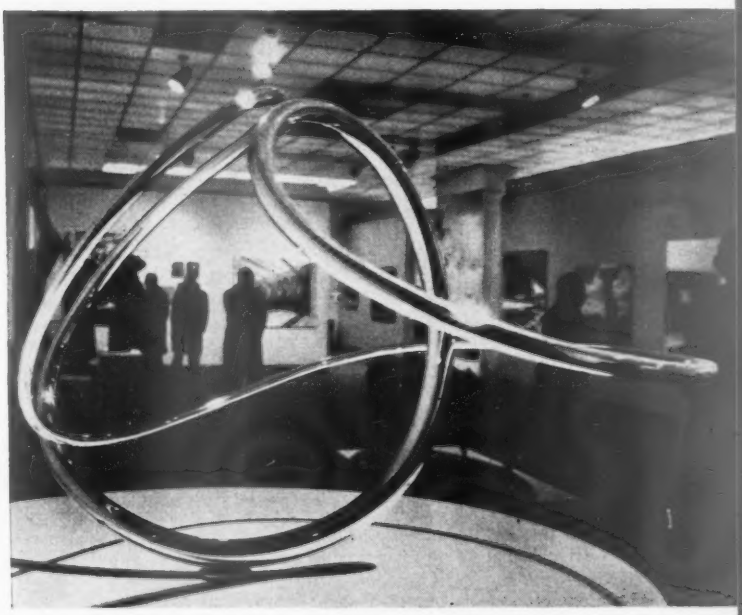
• **Why Buy**—According to answers to Whitney's questionnaire, companies buy art for reasons ranging from a desire to add an artistic note to advertisements to the wish of a top official to have an interesting conversation piece behind his desk. Some find that modern art has a big sales impact. Phonograph record companies, for example, often commission fine artists to design album covers. Greeting card companies use the works of ranking artists.

The growing number of stark, functional modern buildings also is creating a big market. Manufacturers Trust Co.'s Fifth Avenue branch features a sculpture screen by Harry Bertoia. Joseph E. Seagram & Sons' New York headquarters has Mark Rothko's painting, Brown and Black in Reds. And Richard Lippold's Abstract Sculpture—consisting of 5,000 gold-dipped brass rods—hangs behind the bar of the Four Seasons Restaurant in New York.



LANE BRYANT'S Young Mother, by Chaim Gross, was purchased because "it seemed to us timely, elevating, and interesting." The piece eventually will end up in store's maternity department.

IBM'S Compartment C, Car 293 (far left), by Edward Hopper, is part of traveling art show. Parkway Triangle uses Obsession, by Ben Shahn, in lobby of Park Towne Place, Philadelphia.



COLLINS TUTTLE'S Security, by Jose de Rivera, decorates lobby of Life Insurance Bldg. in downtown Manhattan. The stark interiors of modern office buildings provide an ideal background for such art.

GEIGY PHARMACEUTICAL'S Sun, by Harry Bertoia, is part of Whitney Museum exhibit. Drug firms also find that modern art on the cover of their sales literature attracts the attention of busy doctors.

A Big Boost for Branch Banking

● New York's legislature, in a surprising turnabout, passes law allowing commercial and mutual savings banks and savings and loan associations to expand their branches.

● Suburban bankers are up in arms over "invasion" of their territory by big city banks.

● But the New York success encourages advocates of branch banking in other states such as Illinois, Wisconsin, and Missouri.

New York, for more than 100 years a leader in state banking legislation, took another pace-setting step this week. In a surprise move, the legislature approved an omnibus banking bill that gave the green light to an expansion of branch banking. Gov. Nelson Rockefeller immediately signed it into law.

Specifically, the new law: (1) provides for formation and state regulation of bank holding companies; (2) grants additional branching privileges to thrift institutions—mutual saving banks and savings and loan associations; (3) will allow New York City's big commercial banks to establish branch operations beyond the city limits—in adjoining Nassau and Westchester Counties.

Thus, the law opens the way to a major change in New York banking—a move toward wider branch banking. It also has national significance, for New York banking legislation is closely watched—and often followed—by other states.

New York's move toward expansion of branch banking provides fresh ammunition for branch banking forces in other states—Illinois, Wisconsin, Missouri. And New York's provision for bank holding companies—although not new in itself—probably will stimulate other states to lower the barriers they have had against such companies and permit their formation, at least on a restricted basis.

• **Up From the Dead**—Passage of the law—after five years of struggle and after its own sponsor had considered the bill dead for this session—was wholly unexpected and prompted charges of a "political payoff." Arthur T. Roth of Nassau County's Franklin National Bank, a leader in the fight against the big city banks, charged Rockefeller with "a conflict of interest" because of interest in Chase Manhattan Bank, one of the big New York City banks that lobbied for the new law.

The bill became law because of a massive shift in the stand of the Democrats, who had earlier opposed the measure. Most Democrats in the legislature are from New York City, and they were accused of switching their votes in return for the promise of increased aid for the city from the state.

• **In Tune With Times**—Though backroom politics doubtless played a part in the passage of the bill, most banking people not directly involved say such a law was long overdue. They feel that it will serve to bring banking legislation more in line with the economic changes that have taken place in the state.

Its most important provision permits the big New York City banks to branch out into the adjoining suburbs, a right they have been seeking for years. This will enable them to build up their deposits—which they have been losing as their customers moved to the suburbs—and put them in a position to broaden their lending power.

John J. McCloy, chairman of Chase Manhattan, hailed the "constructive" nature of the new law, pointing out that "the metropolitan area has become a unified community and trade center which the city institutions should be permitted to serve." Other New York City banks including First National City, Chase's rival for top spot in the state, took the same view.

Most suburban bankers, however, were bitter about the bill's passage, because it frees the big commercial banks and mutual savings banks to invade their home territory. One Westchester banker called the law "the rape of Westchester." Roth and other Nassau bankers expressed similar views.

• **Slow Start**—It's unlikely, however, that there will be an explosive movement by New York banks to set up new branches. Most big city bankers say they will study the law carefully before making a move. In fact, while New York City banks plumped hardest for branching, it's possible that upstate banks in Buffalo, Syracuse, and Rochester will move first. Many of them are feeling the competition of Marine Midland Corp., the state's only existing statewide bank holding company, and several have been seeking the authority to form new holding companies of their own.

• **Or by Merger?**—New York City banks, moreover, will find it difficult to set up new branches, since few choice spots are still open in suburban counties. Nassau, for instance, has roughly 105 banking offices, so it can hardly be considered as underbanked. The law will not permit branches to be established in communities where the home office of an existing bank is located.

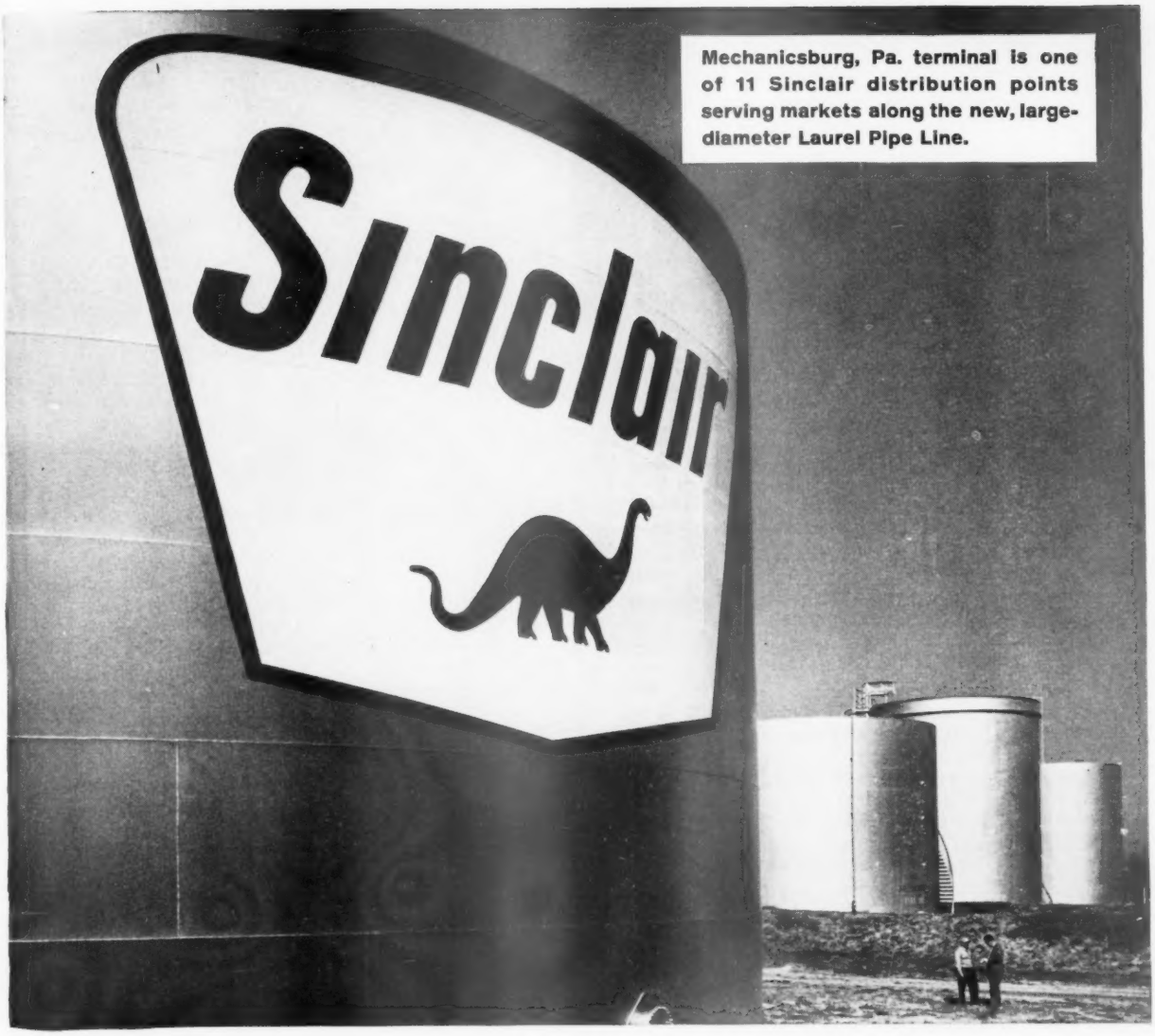
This means the city banks will either have to merge with existing banks—which Chase Manhattan prefers—or form bank holding companies, the route favored by the First National City Bank. Two years ago, First National City tried to form such a company in order to join hands with County Trust Co. of White Plains, but was turned down by the Federal Reserve (BW—Jul.19'58,p36).

The merger route could be very expensive, too, since shares of suburban banks—already high in price because of speculative bidding—probably will shoot higher. Says one suburban banker: "One or two of the big banks—either in the city or in the suburbs—may jump the gun with a merger, but I doubt it. I think it will be a slow process until some bargaining yardsticks are set up."

• **State Control**—The law gives the State Banking Board, by a three-fifths vote, control over bank holding company acquisitions across branch banking district lines. This control is in addition to existing federal regulation. The new rule replaces the freeze on formation of any new bank holding companies, initiated in 1957, that expired this week.

Downstate mutual savings banks will be permitted two additional branches in Nassau and Westchester Counties, while upstate savings banks will be permitted one additional branch. State-chartered savings and loan associations are permitted one branch within five miles of a home office; S&Ls in communities of more than 30,000 population also may apply for additional branches equal to the number permitted to mutual savings banks.

Suburban bankers fear that the spread of mutual savings banks will hurt their own savings deposits. This could happen. No one can tell what the banking map of New York will look like in five or 10 years. One thing is certain, though. The war for banking supremacy in New York, which has been limited to the metropolitan area, will now spread to the suburbs.



Mechanicsburg, Pa. terminal is one of 11 Sinclair distribution points serving markets along the new, large-diameter Laurel Pipe Line.

Battle Station in the War on Costs

No group has waged more vigorous battle against the rising cost of living than the oil industry. Witness that in 1959 the average price of gasoline, exclusive of tax, was less than 6 per cent higher than it was in 1949, while consumer prices generally rose 23 per cent over that period.

A key weapon in battling costs is efficient distribution. *The Sinclair organization continually improves—and is noted for—its ability to move products to market at minimum cost.* One of the most extensive pipeline systems connects six modern refineries with the most populous markets. Tankers and barges make large-volume deliveries. And 1,629 Sinclair bulk distribution stations—which can stock 720 million gallons—provide the flexibility of storage needed to serve economically a market where demand swings sharply with the weather.

Dealers and distributors trading under the dinosaur symbol of fine oil products know a dependable, low-cost distribution system sustains them in the market place. *In the battle against costs, Sinclair has powerful ammunition.*

Sinclair

A Great Name in Oil

SINCLAIR OIL CORPORATION • 600 FIFTH AVENUE • NEW YORK 20, N. Y.

Drug Trade Woos the Public

That's a major switch for an industry that used to speak only to doctors. The cause: unfavorable publicity from the Kefauver investigation.

Sen. Estes Kefauver's probe of the drug industry has been held up for a month by the Senate filibuster on civil rights, but the country's ethical drug producers are still reacting to the first wave of publicity. Not that they're changing their business methods, which they continue to defend, but they are making an about-face in public relations policies.

Throughout its history, the ethical drug industry has concentrated on selling physicians—not the general public—on the efficacy of its products. Not only did producers rarely think about public relations but leaders of the industry actively opposed any such programs.

Most makers of ethical drugs traditionally refuse to let their advertising departments publicize products except in medical journals. Since the industry doesn't sell directly to the public, executives saw no need—and even a danger—in publicizing itself.

• **Company's Riposte**—Today it is clear that the industry's protective cocoon has been severely rent. One of the sharpest examples of how company policies have changed was Abbott Laboratories' full-page ad in the Mar. 21 issue of Life magazine. It was a sober, all-text, point by point denial of statements in a Feb. 15 Life story about the ethical drug industry's ways of doing business.

Abbott Laboratories wasn't mentioned in the Life article, but that is cited as a major reason why it placed the ad. It seemed more proper, says Abbott's Chmn. Elmer B. Vliet, that a company not mentioned by Life represent the industry to the public.

"As a pharmaceutical manufacturer," he explains, "we wanted to reach the same audience that Life did with its article, to present our facts. Our hope is that it may serve a useful purpose in explaining our industry to the public."

Never before has the industry seen much need to explain itself to the public. But before running the ad, Abbott consulted the Pharmaceutical Manufacturers Assn. and found its idea squarely in line with current thinking. As recently as last fall, trade observers say, such an open appeal to the public would have been viewed as close to heretical. Today, Abbott is so pleased by the avalanche of letters from Life readers, almost all favorable, that it may expand its one-shot ad into a broad public education program.

• **Other Reactions**—Most of the other major drug companies are also re-evaluating their public relations, with the result that:

• Public relations departments are being enlarged by new hirings.

• An unprecedented flow of background memos has started from industry offices to editorial desks. One company, Merck & Co., Inc., has already issued four kits of background information on the industry, with four others available on request.

• The Pharmaceutical Manufacturers Assn. has been urging member companies to get their executives out on the banquet circuit whenever possible to straighten out the record.

• Dr. Austin Smith, president of PMA, has been keynoting an industry effort to take the offensive (and the headlines) away from Kefauver by stressing the great expenditure of money ($194-million last year) by drug companies on research. This investment, he says, amounts to 9¢ out of every sales dollar.

• **Slow Beginnings**—For other industries, such tactics are standard, but not for the standoffish ethical drug business. Three years ago, it took a long and determined effort by outside counsel to persuade some of the biggest companies to get even a start made toward an industrywide public relations program. The first outward sign of progress was the formation of the Health News Institute.

At about the same time, PMA organized a public relations committee, made up of company presidents. But it remained merely nominal until about a year ago, when Kefauver's probe of the industry was first rumored. The committee was expanded by addition of company public relations directors.

• **Outside Advice**—With the growing threat of an unfriendly attitude on the part of Kefauver's investigators, PMA appointed a special committee to consider the advisability of retaining outside counsel.

On this committee were William B. Graham, president of Baxter Laboratories, Inc.; Harry J. Loynd, president of Parke, Davis & Co.; Eugene N. Beesley, president of Eli Lilly & Co., and Dr. Smith, president of PMA itself. After canvassing the field, the committee settled on Hill & Knowlton, Inc., for its large staff, regional offices, and—most important—experience in dealing with the government in such industries as steel, aircraft, and natural gas.

However, Hill & Knowlton's asking price—a flat fee of $5,000 per month, plus expenses—floored the drug company presidents. They murmured over it all summer. Then, with the Kefauver hearings only a week or so away, they met with H&K executives one Friday in Washington. Smith, Loynd, and Beesley represented PMA, with power to act; Chmn. John W. Hill, Pres. Bert C. Goss, and John Mapes, chairman of the executive committee, represented H&K.

In the end, the committee told Hill that H&K had the job and asked him how long it would take to get moving. Hill looked at his watch and noted that it was a little after 4 o'clock on a Friday afternoon—he would need until 9 a.m. the next day to get a staff down to Washington, but they could do some cramming over the weekend and be ready to start on Monday morning.

And that's how a public relations program for the industry was born.

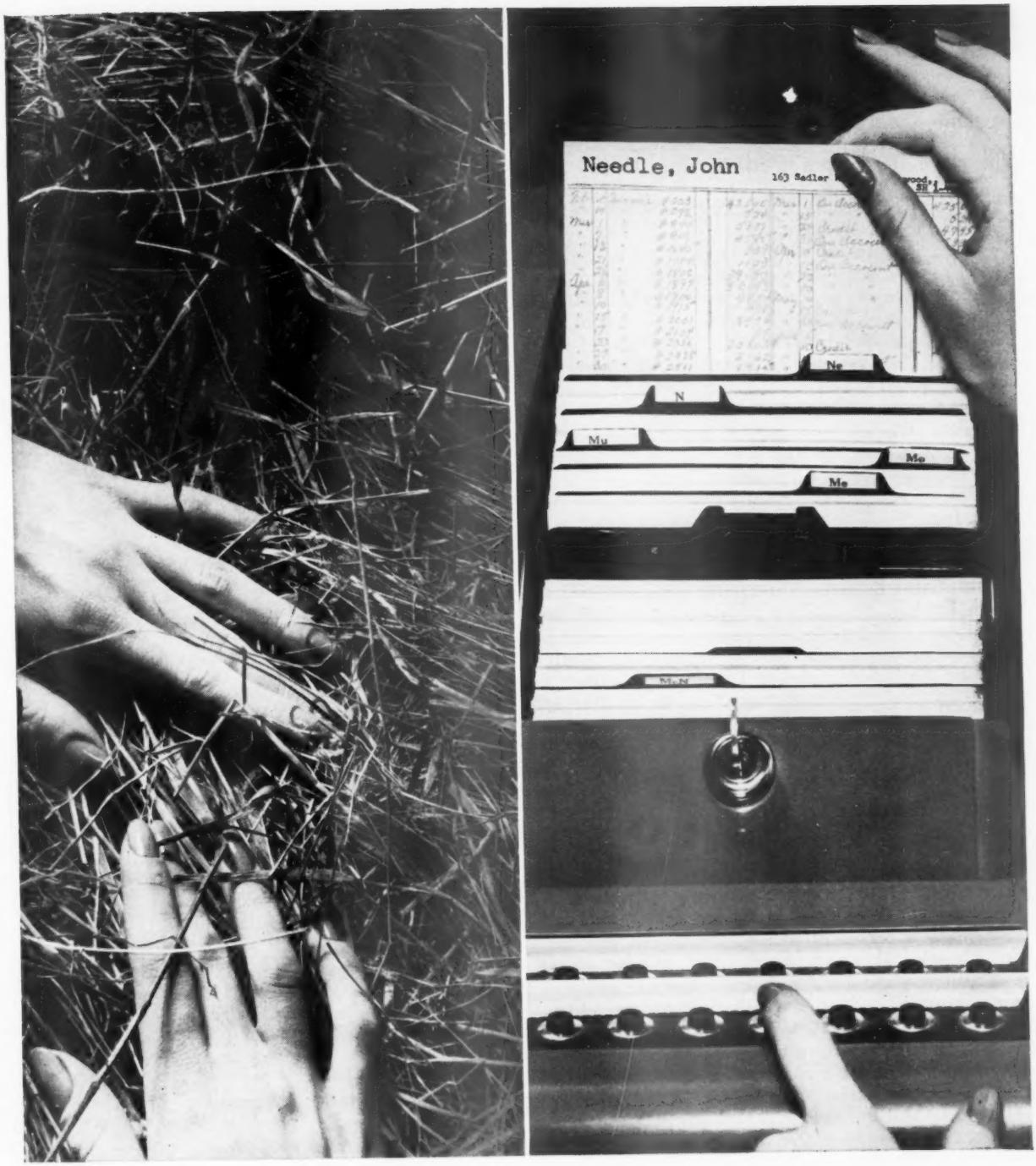
• **Publicity, Good and Bad**—Top officials of drug companies generally agree that the industry's story must be put quickly before the public in "its true perspective." But not all agree that the publicity from the Kefauver hearings could have been avoided or even that it was wholly detrimental.

"From the superior heights of hindsight," says Dr. Robert K. Cutter, president of Cutter Laboratories, "it's obvious that we should have kept the public better informed."

William Bayliss, public relations manager for Upjohn Co., agrees that the industry badly miscalculated its needs for a public education program. "The very fact that the Senate hearings are being held," he says, "is a clear indication that the pharmaceutical industry has failed to inform the general public about itself."

However, second-guessers concede that few drug company people had expected the kind of attack that Kefauver's investigators made—an attack that centered on high profit margins, on the spread between selling price and raw material costs, and disregarding other costs.

In any event, no one in the trade foresees any change in basic business practices as a result of the Kefauver blasts. Detail men will still be relied upon to sell doctors on the merits of new drugs; companies will continue to race each other to market with new products; markups on new drugs will stay high, to pay for the heavy research and development programs.



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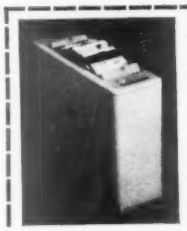

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In Business

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Supreme Court Nips Taxpayers Twice, Will Hear Tuskegee Redistricting Case

Taxpayers lost again this week—in two important rulings by the U. S. Supreme Court:

• By a 5-4 vote, the court upheld its own 1958 decision (by 8-1) that **taxpayers could not have the best of two worlds in challenging government tax assessments.** There are two ways of fighting an assessment: (1) by paying the whole deficiency and then suing for a refund before a perhaps merciful local jury in federal district court, and (2) paying nothing, and fighting the case in the tough U. S. Tax Court in Washington. Taxpayers have sought to combine the methods, paying nothing and suing locally. This practice has now been ruled out of bounds for the second time by the Supreme Court.

• **The court upheld a Florida law that imposes on Scripto, Inc., the chore of collecting a 3% Florida "use" tax on pencils that Scripto sends from Georgia to customers in Florida.** Scripto argued vainly that this was an unconstitutional burden on interstate commerce, since the company has neither offices nor employees in Florida, selling through "independent" commission salesmen.

In a case important to Negro civil rights in the South, the court agreed to hear next fall an appeal from a rejection by lower courts of Negro attacks on a redistricting of Tuskegee, Ala. An Alabama law reshaped the city so that 3,000 Negroes—including almost all of the city's 400 Negro voters—were put outside the boundaries.

• • •

Plane Maker Seeks to Diversify By Renting Out Excess Computer Time

Like many a maker of planes, McDonnell Aircraft Corp. is casting about for means of diversifying itself out of a slightly moribund industry. And like many a major company (1959 sales: nearly $436-million), **McDonnell has set itself up a big computer outfit—one so large that the company's own business keeps its machines and 253-man technical crew busy for only about half of their potential capacity.**

This week, McDonnell added two and two; the four it got was a new division, McDonnell Automation Center, offering the services of its electronic computers to anyone who wants to hire them. The main pitch will be to companies in McDonnell's home area around St. Louis, but customers anywhere in the U. S. can hook in by the new closed telephone circuits.

Biggest eggs in McDonnell's diversification basket are still missiles and rockets, but it hopes the Automation Center will be strong second. The company does not intend to move into wholly unrelated industrial fields.

Makers of jet engines for aircraft are facing an increasingly competitive world as military demand slackens, and is in part replaced by choosy civilian buyers. **General Electric, for one is facing the problem by streamlining its jet operations.**

This week, GE announced the revamping of its Evendale setup (near Cincinnati) with the forming of a single Large Jet Engine Dept. taking in the old jet engine and production engine departments.

The big restaurant chain of Stouffer Corp. does its diversifying both in products and services and in geography. Long since established in frozen foods and contract food service for institutions, Stouffer this week took two new paths:

• In "products," it moved into motor hotels, taking over the luxurious Ana Capri, at Ft. Lauderdale, Fla.

• In geography, it expanded its restaurant business beyond its six Northern cities, leasing the restaurant in the now-building Town House hotel, in West Palm Beach.

• • •

Two New Compact Cars Outstrip Their Parents in Weekly Production

The Automobile Manufacturers Assn. this week rejiggered its method of counting weekly production. The result: Two of the new compact cars were revealed to be outstripping their parent nameplates.

Chrysler Corp. is turning out more **Valiants** than **Plymouths,** while Ford Motor's production of **Comets**—which went on sale only last week—is running ahead of parent **Mercury.**

The AMA figures, which for the first time separated the newcomers from their sires, also revealed that for the week ended Mar. 19, Valiant (6,267) was only a shade behind Corvair (6,270).

GM's big Chevrolets are being turned out quite a bit faster than standard Fords, but the compact Ford Falcon (at 8,202), was well ahead of GM's **Corvair.**

As for the early-bird makers of compacts, American Motors still lumps all three of its lines (for a 9,473 total), while Studebaker-Packard's Lark plant in South Bend was closed by a strike.

The decline in production of Plymouths is largely due to the fact that Dodge dealers, who formerly handled Plymouths, are now selling Dodge Darts instead.

• • •

Age Limit Switches Monsanto Brass

A previously unannounced bylaw of Monsanto Chemical Co. this week brought a major and unexpected shift in the company's top management. The rule: Monsanto's president and chief executive officer must be less than 60 years old—an unusually early mandatory retirement date.

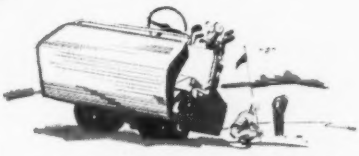
The rule entered the picture because **Pres. Charles Allen Thomas** is fast approaching 60. Since Thomas must leave the presidency, **Chmn. Edgar M. Queeny,** though only 62, retired to the relative calm of chairman of the finance committee. Thomas moved up to the board chairmanship, and the executive vice-president, **Charles H. Sommer,** was appointed president and chief executive officer.

GOODYEAR

NOW tires that go wherever your imagination sends them!

Broad span of sizes: smooth, high-traction and special-design treads.

Move so easily over desert sands, they're ideal for oil exploration.



Cross golf courses in any kind of weather without causing turf damage.

Ride high through treacherous bogs in hauling peat.

Circle race tracks—even graded ovals—without rutting them.

Land light plane softly, safely in unprepared areas—swamps, beaches, plowed fields.

"Go-anywhere" Terra-Tires by Goodyear open areas barred to vehicles until now

Name your terrain. Chances are, the Terra-Tire by Goodyear can cross it with sure-footed ease when other tires—even tracks—give up.

Steep grades? Vehicles equipped with Terra-Tires can climb the roughest hills—"float" over sand dunes and snow—cruise through swamps and marshland. Virtually punctureproof, tires roll right over sharp objects!

The secret: Traction without compaction—these unique, low-pressure pneumatic tires conform to the ground contour rather than resisting it. And the ride is so cushion-soft that springs, shock-absorbers aren't needed.

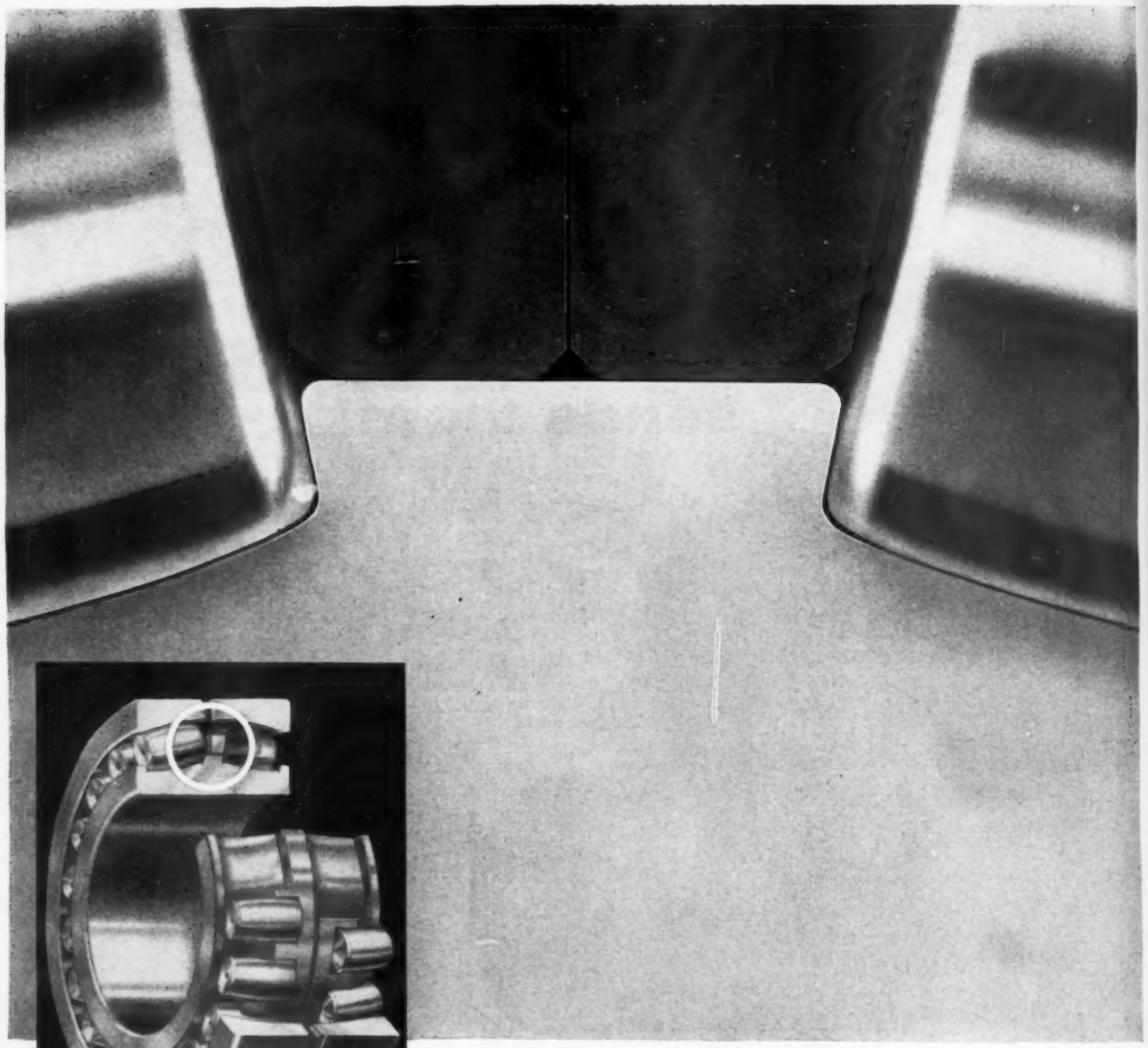
The outlook: Unlimited! Terra-Tires can go almost anywhere your imagination takes them—bringing low-cost transportation to high-potential roadless areas. They're available in a wide range of sizes or can be custom-built for you.

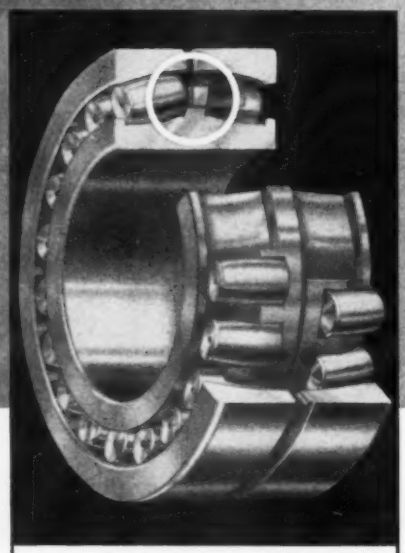
Interested? Write on company letterhead for complete information. Address: The Goodyear Tire & Rubber Company, Aviation Products Division, Dept. O-1734, Akron 16, Ohio.

lots of good things come from

GOODYEAR

Terra-Tire—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio





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Spherical Roller Bearings Offer:

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Send for new Torrington
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Keystone of Stability!

The integral center guide flange of the *Torrington* Spherical Roller Bearing provides *positive* roller guidance—the one best way to insure operating stability under radial and thrust loads.

Center guide flange surfaces and roller ends are ground to a common spherical radius. The asymmetrical roller seeks this flange under load, bearing lightly but constantly against it. Roller wobble and skewing are eliminated, and stress concentrations leading to early failure are avoided. Bearing operation is cooler, quieter and smoother.

The integral guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. It is an engineering refinement, based on experience in all types of applications, that insures outstanding performance in your equipment. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

Every Basic Type of Anti-friction Bearing

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

ST

WASHINGTON OUTLOOK

WASHINGTON
BUREAU
MARCH 26, 1960

The business picture is causing a readjustment of political strategy.

Both parties are taking a second look at the pocketbook issues, with an eye on the November elections. Such issues—the cost of living, wages, welfare programs, farm subsidies, and the like—rate high with practical politicians. Most of them think elections are won or lost in the pocketbooks of voters, except when a dominating personality such as Eisenhower is running.

The GOP has planned right along to campaign on the inflation. Vice-Pres. Nixon began laying the groundwork a year ago, through his Cabinet Committee on Price Stability.

But the issue is all but disappearing as a vote-getter this year. Prices have been steady for months now, and continued stability is expected. A nickel increase in the price of hamburger in October can arouse housewives in an election year, but not increases that occurred a year or two in the past.

Democrats have been working hard to make tight money a vote-getter. They've done this largely in desperation, because no more promising pocketbook issue held much hope for winning friends.

But with interest rates dropping, the issue is losing its zing.

Right now, Federal Reserve officials are willing to let the supply of money rise this year, and to let interest rates fall, on the grounds that inflation is not an immediate threat. If they continue to read the business outlook this way, then Democrats will be hard pressed to breathe any life into tight money by Election Day.

The issue of how fast the economy should grow is losing its glamor.

A couple of months ago this looked like a major point of conflict, with Republicans defending recent growth and Democrats clamoring for more. But in major economic studies, both parties in recent weeks have settled on growth of 4% or 4.5% a year not only as feasible but quite likely to occur.

Even the spending issue is being blunted. For the second year in a row, Democrats are in the process of cutting Pres. Eisenhower's budget. The leading economic thinkers among the Democrats in Congress agree with Eisenhower that the budget surplus he foresees for next fiscal year is a good thing, and should be applied to debt reduction.

Nixon is allowing his Cabinet Committee on Prices to remain inactive. Reports on inflation and economic growth that the committee staff prepared are still in the files and will stay there unless the economic picture changes unexpectedly.

Instead of inflation, Nixon is stressing welfare programs. He's pushing for change in the minimum wage law, is interested in a health plan for the aged, and is linked to GOP moves for some kind of aid-to-education legislation this session. His campaign will put more emphasis on social welfare than it would have if fear of inflation had remained a lively issue or if Democrats had broken the Eisenhower budget with a series of new spending programs.

Republicans are splitting on medical help for the aged.

Nixon may be the loser, though perhaps not too seriously. He and

WASHINGTON BUREAU MARCH 26, 1960

Secy. James P. Mitchell and Secy. Arthur S. Flemming have been trying to come up with an Administration answer to the Democratic Forand bill that would use the social security law to help pay the health bills of the aged. Their basic idea: some form of federal-state aid to old people, but short of putting medical insurance into the old age pension system.

But opposition pressure mounted among Republicans in Congress and in the Treasury and Budget Bureau. The President this week told Flemming there would be no Administration program for him to take to Congress.

A significant fact: Senate and House Republican leaders were still taking advice from the President, rather than from Nixon.

The Democrats are reacting slowly. Neither Sen. John Kennedy nor Sen. Hubert Humphrey have yet come up with anything new in their hot Wisconsin battle.

—•—

The Humphrey-Kennedy battle (page 162) takes a new turn.

Humphrey is on the attack, sharpening up the differences. In rural Wisconsin, he compares Kennedy's past farm voting record with Vice-Pres. Nixon's. He cites Kennedy votes as far back as 11 years ago.

Humphrey portrays Kennedy as the rich man's friend on tax issues. He says Kennedy in 1958 opposed a reduction of the oil depletion allowance, and in 1954 opposed a raise in higher-bracket income tax rates and a reduction for lower-income groups.

Kennedy's strategy shows no sign of change. Assisted by the two top Wisconsin Democrats—Sen. William Proxmire and Gov. Gaylord Nelson—he cultivates the idea that there is no large difference on the issues between himself and Humphrey.

The Wisconsin campaigns of Humphrey and Kennedy are a study in contrasts. It is more than the fact that Kennedy stumps the state in his own airplane while Humphrey goes by chartered bus. An incident this week illustrates this:

While Kennedy was playing host at a public reception for 5,000 persons who overflowed the main ballroom of Milwaukee's Schroeder Hotel, Humphrey was 15 blocks away at an NAACP forum in the Antioch Baptist Church, sharing time with candidates for mayor and alderman. Humphrey delivered a rip-roaring civil rights speech that had the audience of 500 clapping, laughing, and shouting "Amen, brother."

Kennedy was represented by his brother, Robert, who, looking uncomfortable, read his brother's prepared text which concluded with a quotation from Pericles on the need for brave hearts. He got only polite applause.

—•—

Congress will order a watered-down study of competitive fuels. The coal industry's new lobby, the National Coal Policy Conference, yielded to opposition—by oil and gas interests and by Administration officials—and is dropping its plans for a Congressional study designed to determine the proper use for the competing fuels. Instead, coal-sponsored resolutions will ask Congress for a simpler study avoiding the controversy over "end-use" controls. However, petroleum opposition will continue.

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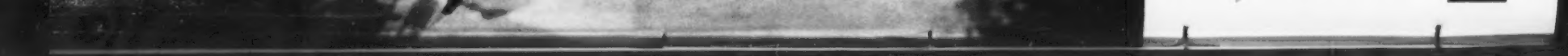

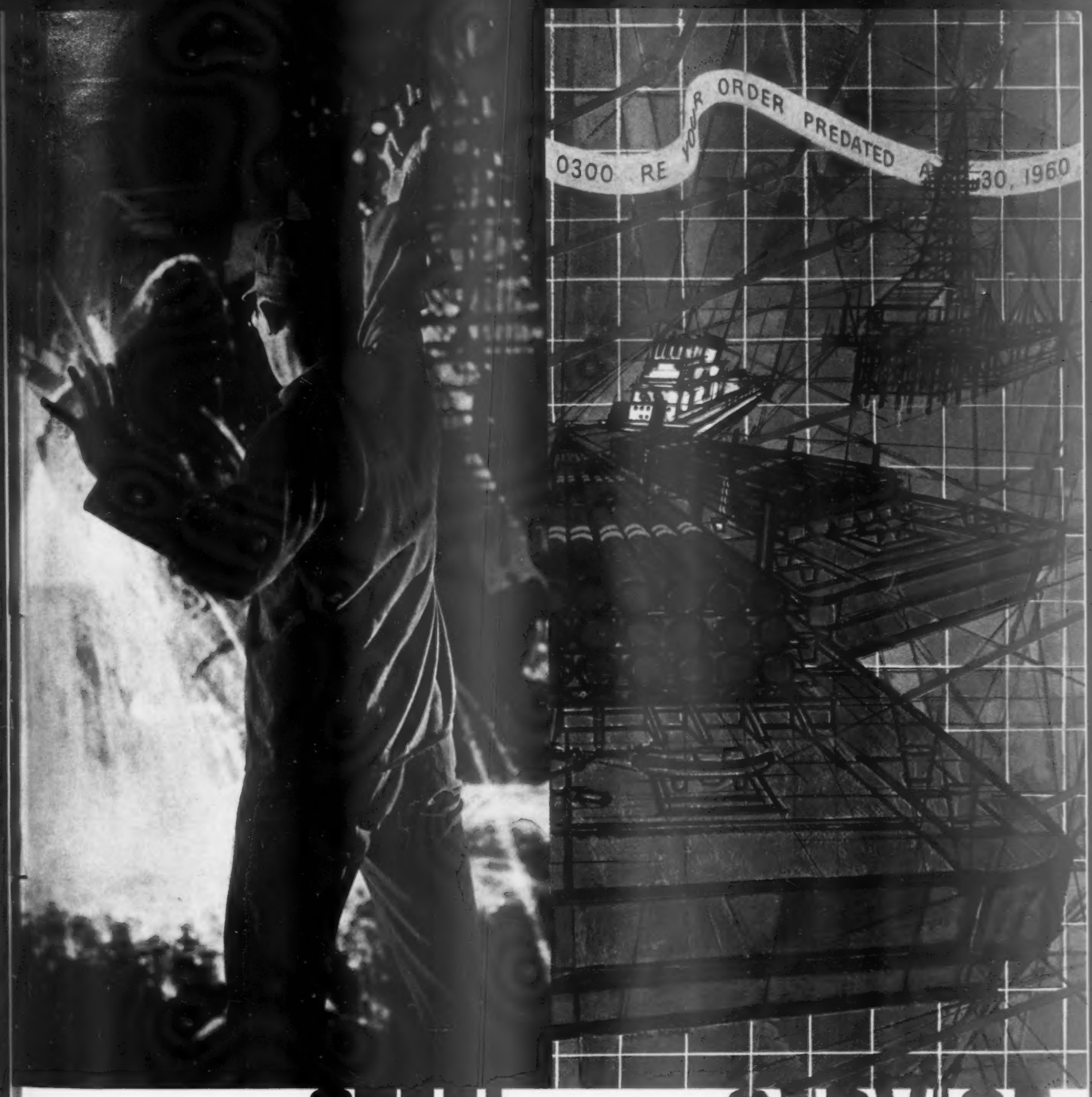

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In Labor

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Landrum-Griffin Brings Lively Business In Supervising Elections for Wary Unions

The Landrum-Griffin Act is having a number of unexpected results. One of the latest to come to light is the increase in competition among outside agencies for the job of administering union elections.

The provisions in the law calling for democratic election of union officers are making the unions chary of charges of rigging. To make certain they don't run afoul of such accusations under the reform act, unions are more frequently calling in outsiders to watchdog elections.

To compete more successfully for this added business, the American Arbitration Assn. recently set up a special department to handle the administration of union elections. Competition includes an old-stand-by, the Honest Ballot Association, and a newcomer, the Election Institute, founded by a former AAA staffer, Herbert Schmertz.

• • •

Union's Plan to Purchase Hospital Opposed by Local Medical Group

Organized labor and organized medicine this week appeared headed for a fight over the proposed purchase of a 175-bed Long Island hospital by the Long Island Federation of Labor.

The labor group—covering 100,000 members on Long Island—plans to buy and operate the Hempstead General Hospital through a nonprofit corporation financed out of the pension, welfare, and treasury reserves of its 102 affiliates.

The Nassau Physicians Guild, an offshoot of the county medical society, has warned that the purchase would be a move toward closed-panel medicine that would shut out the traditional free choice of doctors.

Union leaders have been unhappy about the mounting cost of medical care and are watching the Long Island hassle closely. The New York City Central Labor Council, for example, has appointed a committee to study the feasibility of establishing union-owned hospitals.

• • •

Independent Union Wins at Esso Plant In Run-Off of Four-Way Contest

The independent Petroleum Workers defeated the Oil, Chemical & Atomic Workers in a run-off National Labor Relations Board election among employees of Esso's Bayway (N.J.) refinery. The independent union won by 699 votes to OCAW's 647.

The election followed an earlier four-way contest (BW—Mar.5'60,p45) in which the Teamsters and the Operating Engineers were counted out. The Teamsters maintained an active interest in the outcome, since the present officers of the PWB are considered pro-Teamsters.

MORE NEWS ABOUT LABOR ON:

- P. 45—Murder bares quiet labor probe.
- P. 50—Bargaining moves ahead as aircraft industry talks begin.
- P. 54—Small employers discuss their biggest industrial relations problems.
- P. 58—Rift in AFL-CIO widens as Plumbers leave IUD.

• • •

Board Set Up Under Railway Act To Look Into Pan Am Labor Dispute

Pres. Eisenhower last week created a three-man emergency disputes board under the Railway Labor Act to head off a threatened strike of Pan American World Airways ground employees.

Some 6,000 clerks, agents, and freight handlers, represented by the Brotherhood of Railway & Steamship Clerks, voted to strike in a dispute over a new contract. The Presidential action in effect blocks a strike for 60 days.

In another development, Pan Am agreed to talk with the Air Line Pilots Assn. about a work practice issue. The pilots had refused to accept assignments on flights of more than eight hours without a relief pilot. Agreement to talk averted strike action, at least temporarily.

• • •

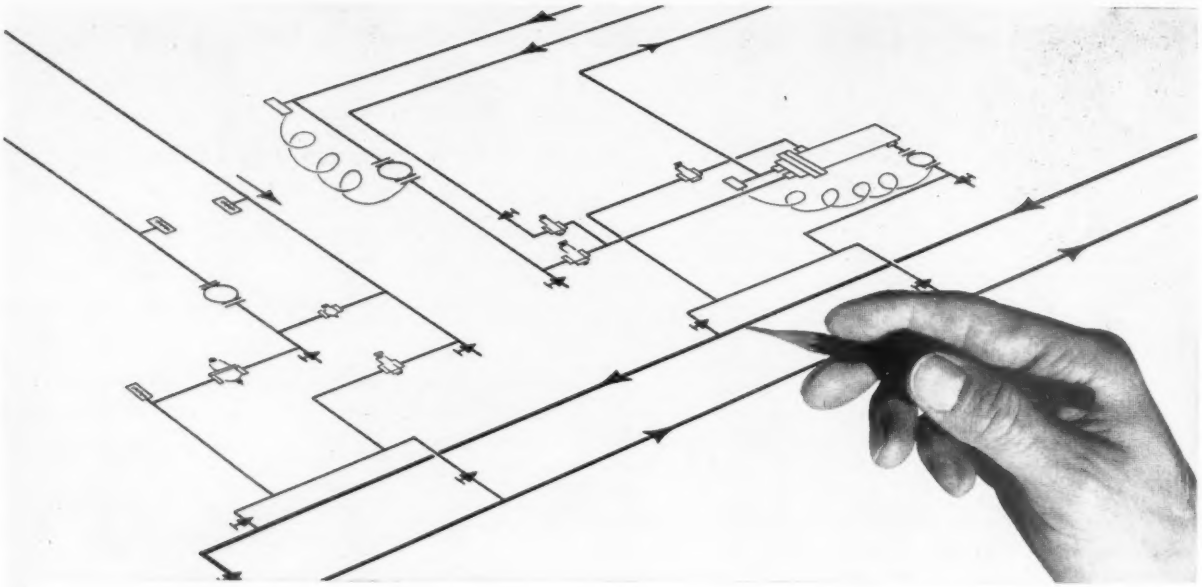
Two Senate Committees Vie for Job Of Carrying on Rackets Probes

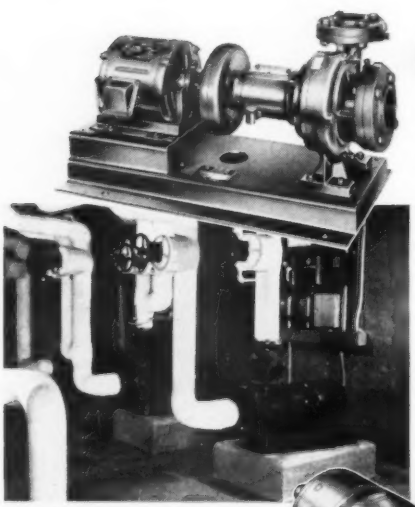
Now that the Senate Select Committee on Improper Activities in the Labor & Management Field is ready to fold up, who will pick up its franchise—the Committee on Government Operations, headed by Sen. John L. McClellan (D-Ark.), or the Labor & Public Welfare Committee, headed by Sen. Lister Hill (D-Ala.)?

Sen. McClellan, who has guided the racket investigations of the Senate Select Committee, would like to keep his hand on the reins by transferring the authority of the Select Committee to his Committee on Government Operations.

But the **Labor & Public Welfare Committee has the prior claim on the legislative calendar with a resolution authorizing the continued employment of the Select Committee staff under its aegis until Jan. 31.**

The unions are backing the bid of the Labor & Public Welfare Committee on the chance that the whole watchdog operation would die Jan. 31. In any case, **they are taking the position that if there's got to be a watchdog, they'd prefer that it not be McClellan.**





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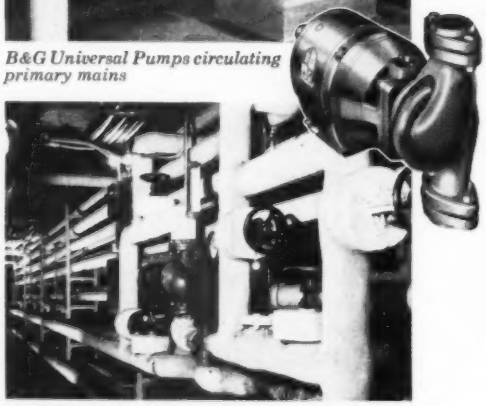

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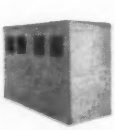

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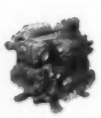

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Murder Bares Quiet Labor Probe

● **Slaying of Chicago movie projectionist leaves few clews but many possible motives.**

● **And it spotlights a Labor Dept. inquiry into Landrum-Griffin Law charges of racketeering in his union.**

● **The slain man was not a complainant in the case, but he was expected to talk to the investigators.**

The U.S. Labor Dept. opened its first investigation into union racketeering under the Landrum-Griffin Act quietly enough.

Film projectionists in Chicago have complained that they were being victimized by their union, Local 110 of the International Alliance of Theatrical Stage Employees & Moving Picture Machine Operators. An investigator from the Labor Dept.'s Compliance & Enforcement Div. of the new Bureau of Labor-Management Reports was sent to Chicago to check.

Several weeks later, a leader of a rebel group within the union, 73-year-old film projectionist Herman Posner, was slashed to death in a knife attack. He was killed early in the morning of Feb. 9, just after he parked his car after returning to his West Side home from his night job.

• **Secrecy Lost**—The murder—and along with it the Labor Dept.'s investigation into Local 110—was splashed in lurid headlines across front pages of Chicago's dailies, a development that upset the plans of the Labor Dept.

"If it hadn't been for the murder," says Daniel L. O'Connor, Asst. Commissioner for Compliance & Enforcement, "nobody would have known about [the investigation] until we went into court."

The Posner case is one to delight Agatha Christie fans. There are several probable motives for the murder: Robbery—possibly ruled out because a diamond ring was left on Posner's finger and $40 in cash left in his pocket; Posner's sideline, he sold diamonds in addition to being a movie projectionist, or an attempt to keep him quiet about labor abuses. Posner was not among those who filed complaints with the Labor Dept., but it was known that he intended to talk to investigators.

It might have been a random killing. It could have been a mob affair. There have been several murders on Chicago's West Side recently, and the gang slaying of Roger Touhy occurred only a block away.

"There's no evidence Posner was killed attempting to exercise his rights under federal labor law," O'Connor says. Nevertheless, the Labor Dept. has assigned several full-time investigators to the case, the only one to get such special treatment so far.

• **Many Complaints**—The Local 110 case began routinely for the Labor Dept.—as one of many complaints being filed. On Mar. 15, the Bureau of Labor-Management Reports had received 820 complaints. Of these, 523 were pending and 227 had been closed—mostly on a ruling of lack of jurisdiction because the alleged violations occurred before the reform bill was passed. Since Mar. 1, complaints have been averaging 142 a week. In all, 30 cases have been referred to the Justice Dept. for prosecution. These include some charges of violence involving union members trying to exercise their rights under the Landrum-Griffin Act.

There have been no prosecutions—yet.

"We've only scratched the surface on complaints," O'Connor says. He anticipates a much heavier case load in the future. For instance, under L-G's election provisions, the enforcement of complaints can't begin until internal union remedies are exhausted by the complainant. At this point 101 election complaints are on file, waiting out this procedure, which must be run through in the union within 90 days.

• **Financial Reports**—O'Connor also anticipates a run of charges based on union financial reports. Some 80%, or 25,000, must be filed with the Bureau by Mar. 31. After these are looked over, O'Connor expects some further complaints from unionists. Checking these out is expected to be a time consuming process.

As in the Posner affair, most of the complaints filed with the Labor Dept. involve local unions rather than internationals. All of the unions looked into by the McClellan committee have complaints lodged against them, as well as a number that didn't receive notoriety during the three years of Congressional probing. The Chicago Moving Picture Machine Operators local was one of these.

While most of the complaints, on investigation, turn out to have some validity, the bureau does run into "habitual complainers." O'Connor says most of these can be detected quickly. Handling the complaints can be difficult. Many letters are illiterate or vague. Many are unsigned.

Investigators also run into personal feuds. A New Orleans complainant charged that a "goon pulled a pistol" on him. On investigation, it was discovered that the man accused had pulled the gun to get the complainant to stop accusing him of being a Communist. The bureau dropped this one.

• **Jurisdiction**—Another major problem—and one that has yet to be ironed out—is jurisdiction. There are still many questions unanswered as to what acts violate the Landrum-Griffin law.

The enforcement staff is still feeling its way. The ceiling on the number of investigators is 117 until the enforcement program shakes down—or until the Labor Dept. gets more money from Congress. Most of the investigators are recruited from other agencies, such as the Internal Revenue Service, the Wage-Hour Div., and so on. A few are ex-FBI agents. The emphasis in hiring—where possible—is on federal experience.

Although the bureau's staff has all the McClellan committee material it wants and needs to work from, the Labor Dept. investigators must operate differently than those who were on the committee staff. The McClellan committee probers exposed corruption for legislative purposes; the Labor Dept. gumshoes must collect evidence that can be presented in court. And, as O'Connor is quick to point out, "It's a tough job."

• **Unsavory Past**—The Posner case illustrates the difficulty. The Chicago Moving Picture Machine Operators local had an unsavory reputation for many years. Local 110 was involved in the 1920s with the Capone and "Bugs" Moran mobs, and, in the 1930s, with the George Browne-Nick Circella-Willie Bioff gangster outfits.

Current complaints before the Labor Dept. and state law enforcement agencies charge that kickbacks are expected from union members who get top paying, preferred jobs.

John Accardo, brother of frequently investigated Tony Accardo, is a member of the union. So is Mauro (Joe Jr.) Montana, who is now facing deportation from the United States as an undesirable alien.

Herman Posner's son, Barney, a former projectionist, has charged that Montana attempted to bully his father and him into line in 1953, during an early challenge to the Local 110 leader-

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Why does size of block affect value of stock?

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...complaints against union stem from job situation, its defenders say . . .

(STORY on page 45)

ship. Montana, says Barney Posner, slapped him in the face and threatened to use a pistol against his father.

Local 110 is a small union—some 600 members—but rich. Its health-welfare fund was reported in 1956 to have some $2-million in reserves. Contributions from employers run almost $1-million a year.

• **Job Control**—The chubby and balding business manager of the local is Clarence A. Jalas. He controls job assignments; employers have no say over who operates the cameras in their projection booths. Jalas is also a businessman. He is the head of Essannay Electrical Mfg. Co., a movie projector equipment company that employs nonunion operators. He denies that he or the local has any connection with gangsters.

Indeed, for all its reputation, no one has ever pinned anything on Local 110. There have been at least two federal grand jury investigations into the union—and nothing ever happened. There were no indictments, no follow-ups. In 1958, the McClellan committee looked into the union but subsequently dropped the probe. Richard F. Walsh, IATSE president, has said he has had no complaints that would warrant an investigation of Local 110, or a trusteeship.

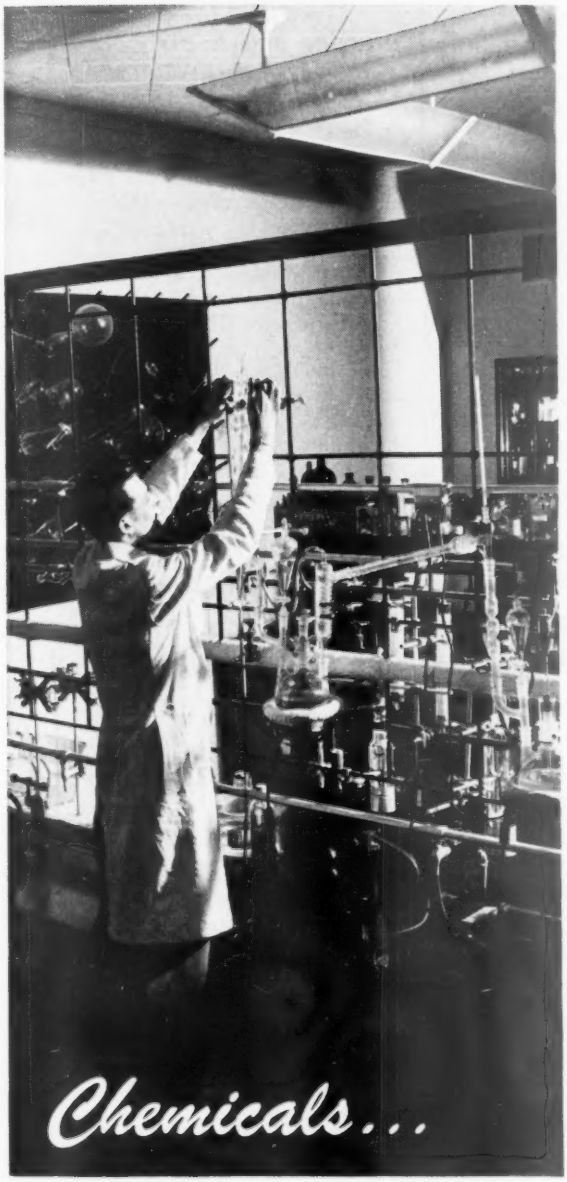
With this in mind, close observers of the Chicago rackets scene wonder if the Labor Dept. will be able to do any better.

The complaints against the union, say its defenders, stem from the job situation, not from abuses of union referral practices. Many movie houses have closed down in recent years. Some 200 union members are constantly out of work. Jobs are rotated by compelling members to take a week of vacation without pay once a year.

• **Seven-Day Week**—Oddly enough, the operators work a seven-day week in violation of a state law, ignored after it was passed in 1937. According to a state official, a conference between union leaders, theater owners, and state officials decided that the law should be overlooked.

"The union and theater owners said that everyone was happy with the seven-day week, and so we never have done anything about it," says Lewis E. Michael, a supervisor of inspectors for the Illinois Labor Dept. Operators work a five- or six-hour day.

According to the union, two four-week paid vacations during the year give



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. . . the big question is: Will murder scare off other informants? . . .

(STORY on page 45)

projectionists the equivalent of one day off each week.

Just before his murder, Posner had demanded that the state enforce the law against the seven-day week and collect back fines from theater owners. It wasn't a popular demand for, as Michael points out, the levying of fines on past violations would put some theater owners out of business.

But, it is reported, Posner said that he "didn't care" if this happened. Illinois Labor Dept. officials got the impression that he was out to cause trouble for the union over the labor contracts with theater operators. It was at this point he was ready to go and talk to Labor Dept. Compliance & Enforcement investigators. He was killed before he was able to do so.

• **Trusteeship**—Whether Posner's death has scared off other informants, the Labor Dept. investigators won't say. One of Posner's close associates, Zadig Paloian, a 61-year-old projectionist and a union member for 40 years, vows he won't quit: "I won't back down on my complaints now, with Herman dead."

Before Posner's death, Paloian had appealed to the international union for a trusteeship over Local 110, demanding the removal of Jalas. The only result, he says, was a series of overtures from top officials who asked that Paloian—and Posner, who helped draft the plea—make peace with Jalas. Paloian also charged that Jalas shunted operators who opposed his rule to low-paying jobs in outlying theaters. Paloian says his take-home has been reduced to $70 a week because Jalas ousted him from a decent post.

The police have maintained a bodyguard for Paloian since the death of Posner.

The Labor Dept. investigators are now collecting what evidence they can in Chicago. The files on the Moving Picture Machine Operators local are already bulging. O'Connor won't say how many men he has working in Chicago, nor will he spell out what the C&E division has uncovered so far. "We don't want to forewarn our enemy," he says.

The C&E division views its first major case with mixed feelings. "It's too much publicity, too soon," a staff man says. "If we break it wide open, the kudos will be loud and plentiful. But if we fail, Lord knows, we'll be in much more hot water than we deserve." **END**

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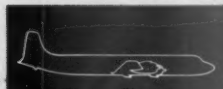
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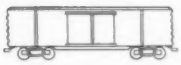
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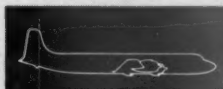
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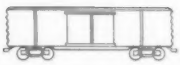
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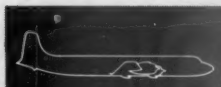
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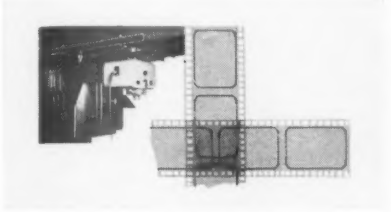

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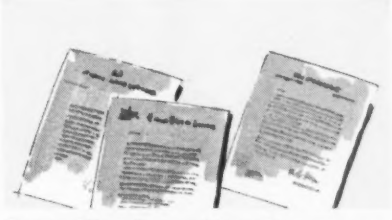

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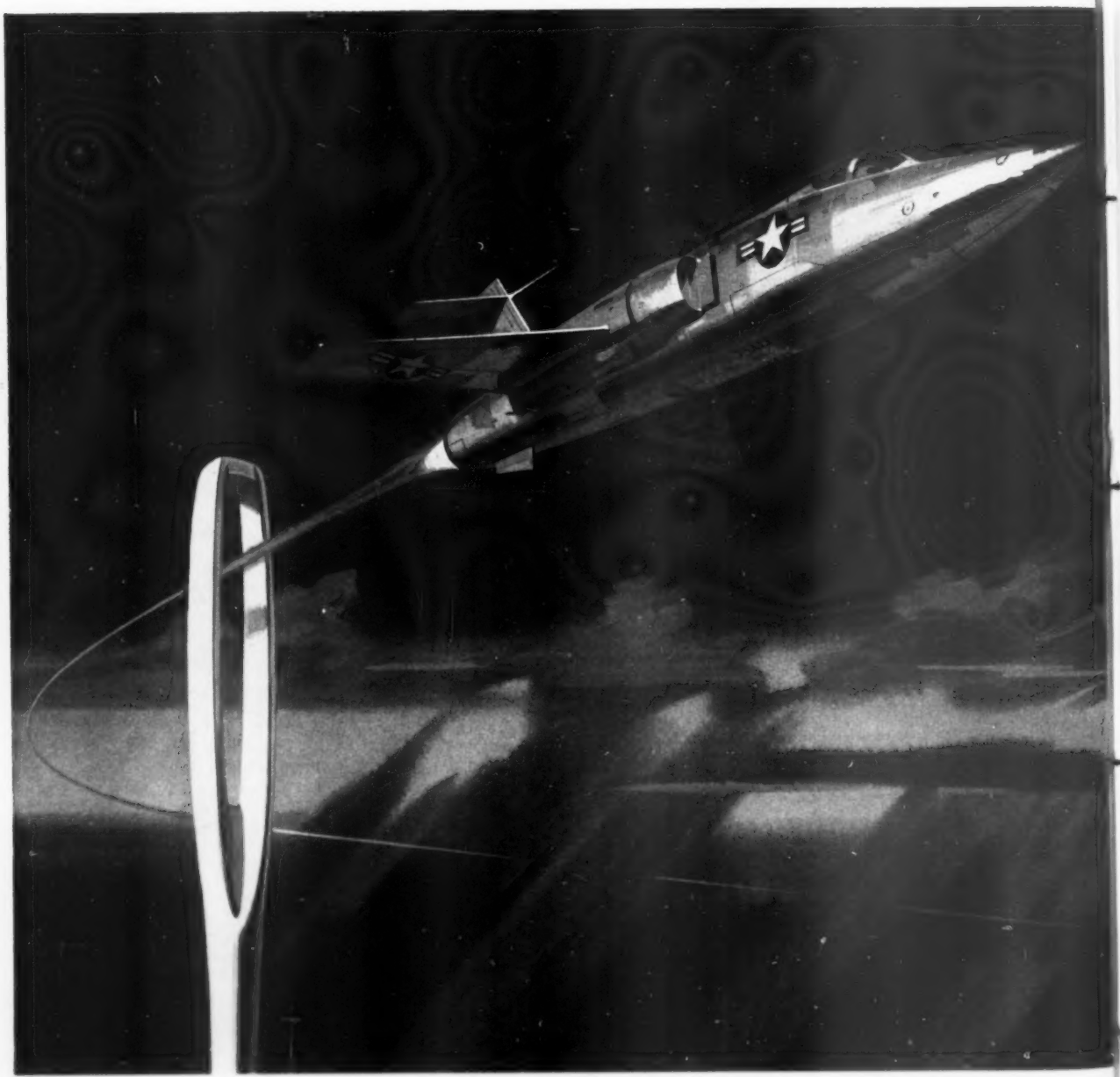

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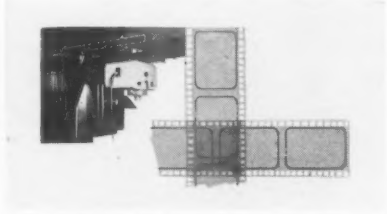

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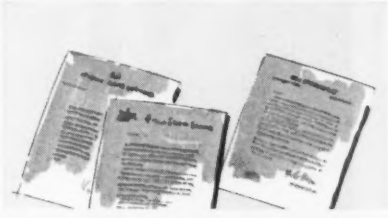

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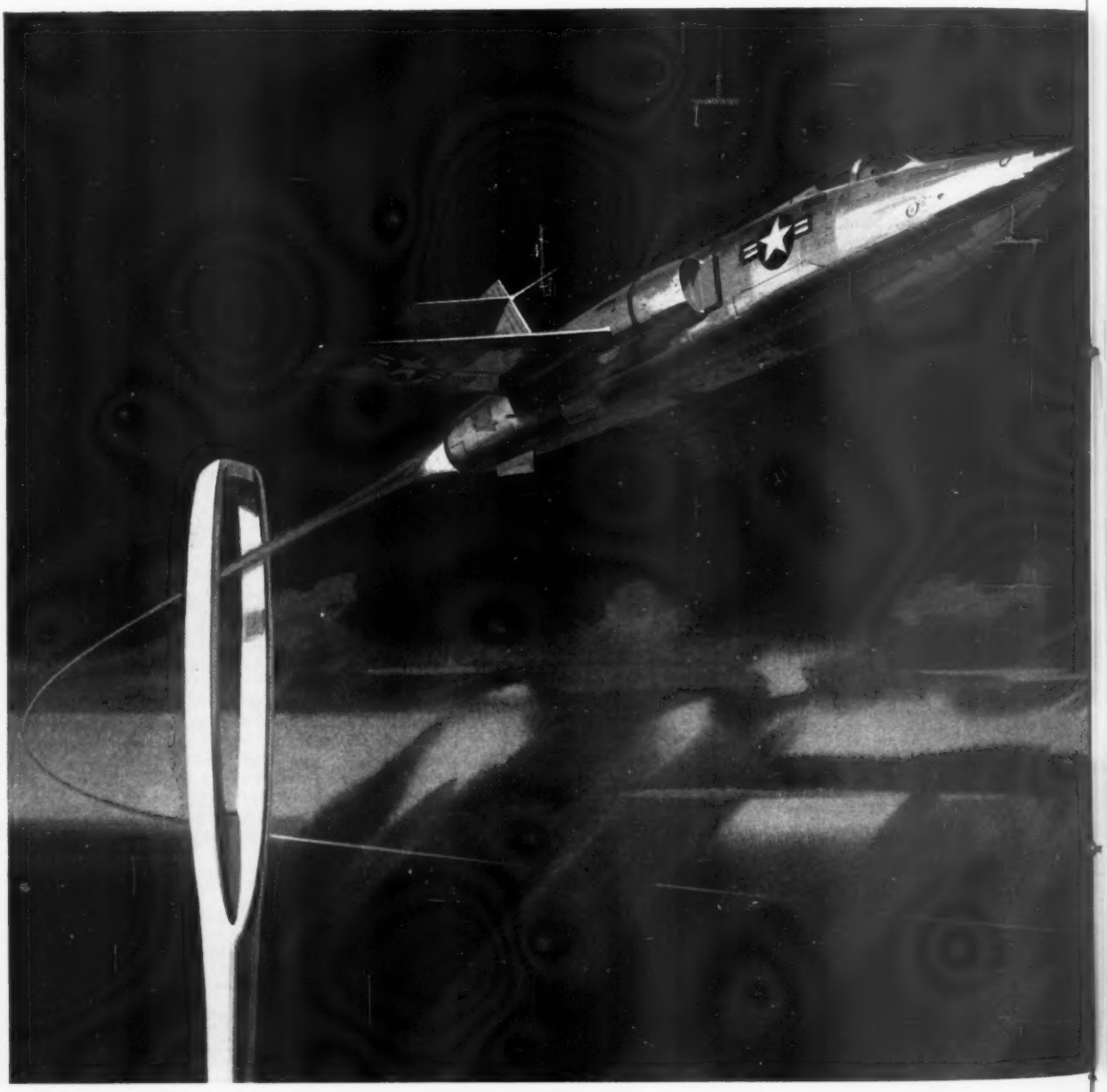

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Management Won't Ease Up

Tough attitude in bargaining with labor will stay awhile, probably into 1961. The major reasons: fear of rising costs and erosion of the boss' rights.

The tough attitude management took in collective bargaining as it felt the pinch of recession in 1958 and followed the lead of basic steel in 1959 is going to continue through this year—probably into 1961.

Signs of this can be seen in negotiations already completed and in the aircraft bargaining just getting under way (page 50), with electrical manufacturing the most important industry in conflict with unions over wage and other contract terms this year.

The signs could be seen, too, at an Institute on Industrial Relations sponsored in Florida by the National Assn. of Manufacturers and attended, primarily, by top-level executives of small and medium-sized companies, mostly employers of fewer than 5,000 persons.

The Institute, held in Hollywood, was perhaps the most important of some 200 gatherings, for the most part local ones, held by industrial relations executives in the last few months, to discuss management's problems with high labor costs and eroded management rights—and to seek guidance on what might be done about them.

• **In the South**—The meetings have been particularly prevalent in the South, where another concern has been on the agenda—a question of what can be done, within the letter of the law, to keep unions out of plants or mills or to minimize the impact of those already in with toeholds or beachheads.

This was a discussion topic at the NAM conference, too, but it was of less concern there. More emphasis was on the problems of organized plants and what NAM leaders described as the "gradual erosion of management rights" in industrial relations over the past two decades. What the 175 conferees wanted was guidance on what they as employers should do to "recapture and defend" management rights. They exchanged views on this, and agreed that a strong stand—buttressed by all weapons available to a determined management—must be taken.

"It is more imperative than ever before for management to come to the bargaining table . . . adequately prepared for any eventuality," J. George Piccoli, manager of labor relations for General Aniline & Film Corp., told a seminar on collective bargaining. He warned that unions have made tremendous strides in their negotiating techniques, including year-round campaigns to win public support, and that small managements, particularly, are likely to be at a disadvantage.

• **Preparedness**—One answer he suggested: Preparations to defend to the maximum degree the provisions and principles management believes should be in its contracts—including whatever is necessary to take a strike and win it.

The small and medium-sized employers are ordinarily the most vulnerable to labor's attack. Through the years, many of them have been whipsawed by unions into settlement with terms they now regret. At Hollywood, many of the conferees acknowledged this. They conceded they have given away too much through the years, in the interest of peace with their unions.

But, they said, that's past. Even if it means trouble, unions must now be met head-on at bargaining tables, in a "now or never" manner.

In large measure, this sentiment, stronger even than in the immediate recesison period of late 1958 and early 1959, apparently rose out of a very real worry about labor costs. In part, it apparently is a recognition that however strong unions may be, they are probably more vulnerable to attack now than at any time in recent years.

• **Fear of Costs**—In the area of labor costs, the conference couldn't put aside its worries of being outpriced by foreign competitors. More than half of those attending the conference said that imports already are a cause for worry in their industries—underselling American products in general from 10% to 40% but as much as 60% in some instances.

Asked to estimate their lost business, the executives cited figures of from 3% to as much as 30%. One, in the machine tools industry, predicted that imports may eventually eliminate the manufacture of some basic equipment. Another, a wire producer in Wisconsin, said that competition from Denmark has virtually ended barbwire production in this country; he still produces limited quantities but only because "special circumstances" make it possible.

The threat of foreign competition tempered the conference's optimism over business prospects for 1960. More than half apparently expect business gains—but they are inclined to talk about them on an "if" basis, if labor costs can be controlled and production efficiency can be improved.

Collective bargaining discussions pointed up the fact that most of the smaller employers had hoped the steel

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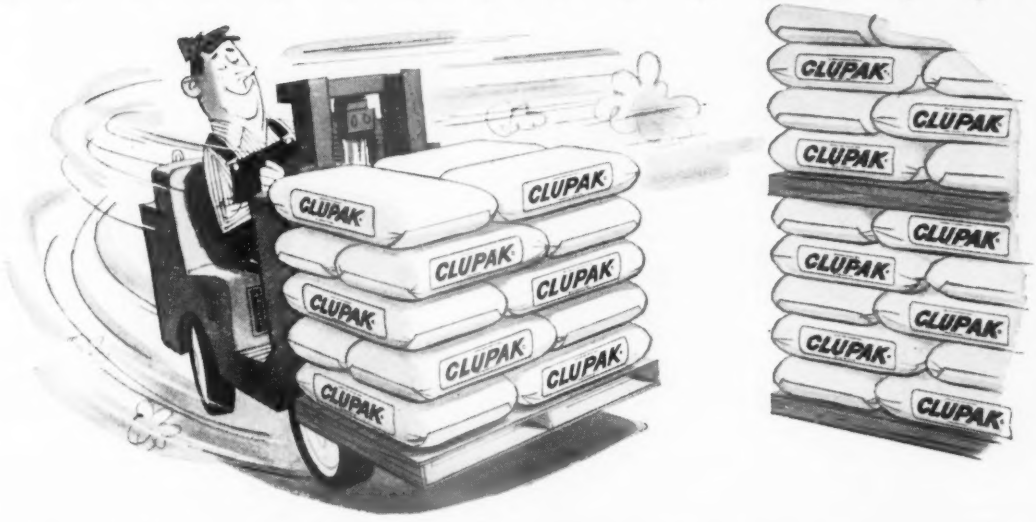

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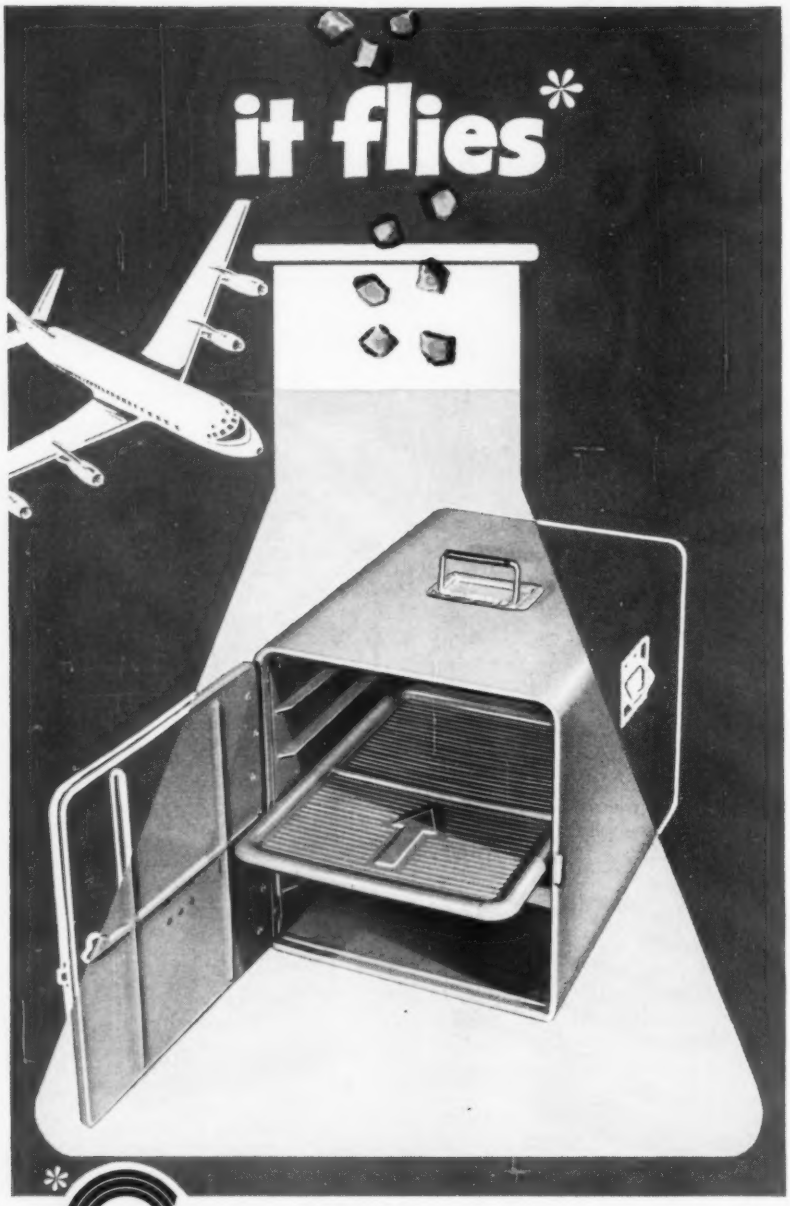

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WEST VIRGINIA

industry might relieve labor's strong pressure for more pay and higher overall costs with a precedent-setting victory in 1959. The steel industry didn't. Now they're inclined to say that the steel terms will mean "the most difficult and troublesome union negotiations of the past two decades" for smaller employers.

• **Big Industry**—Along with worries about big unionism, companies represented at the Florida conference indicated a growing concern over the bargaining practices of big companies. Undoubtedly this wouldn't have been so if the steel industry had won the victory it sought—and the smaller manufacturers hoped it would. But, because it didn't, conferees urged more bargaining on a basis of individual company or plant circumstances—not industrywide or companywide.

So, in general, they stressed two things particularly—the necessity of regaining the right to manage and the need for localized bargaining, a turn away from negotiations and "inflationary wage increases on a national level," as a conferee put it.

"Capitulation of some big businesses to big unions establishes trends and patterns smaller companies must follow—although we can't afford what the big companies can," one employer, a tool-and-die shop operator, complained.

Others were just as vigorous—and blunt—in criticizing the role the government took in bringing the steel impasse to an end this January, after nine months of futile contract bargaining and a 116-day steel strike. They blamed government and political influences on business and labor for forced settlements in negotiations, in the words of one man, "Without thought of the far-reaching consequences."

• **Old Policies**—Few answers to problems evolved. Perhaps nobody expected there would be answers. The policies enunciated with echoing frequency were for the most part the ones the NAM has advocated through the years.

That was to be expected. Those attending were almost entirely followers of NAM's line, consistently and precisely.

They did not agree as regularly on techniques: for instance, whether to operate during a strike or to stockpile inventories—preferably outside the plant or mill—and sit out a strike.

They did show a substantial agreement in one surprising area: They conceded that a large part of management—some frankly included their own companies—must share the blame for "soft" production practices. Management has made advances in communications techniques, but not enough, they said. It hasn't always assured itself the best supervision—or even a management-minded supervision. **END**

SOUTHERN CALIFORNIA EDISON COMPANY

64th ANNUAL REPORT

1959 FINANCIAL HIGHLIGHTS

	1959	% Increase Over 1958
Common Dividend Rate	$2.60	8.3
Earnings Per Share (Company only)*	3.80	2.7
Gross Electric Plant	$1,366,097,306	7.7
Gross Revenue	$281,763,942	10.0
Operating Expenses	$220,804,989	10.1
Taxes	$81,544,899	11.5
Net Income	$43,394,886	8.5
Payrolls	$56,910,662	6.6
Total Meters	1,628,694	4.3
Energy Sales (1,000 Kwh)	15,698,837	13.5
System Peak Demand (Kw)	3,181,000	7.4
Generating Capacity (Kw)	3,833,920	12.6

NEW PLANT

Edison's plant expansion program was continued in 1959 with the completion of two steam generating units, each with an effective operating capacity of 215,000 kilowatts. Presently under construction at the Huntington Beach Steam Station are two new units which will boost the overall capacity of that station to 875,000 kilowatts. These are the first computer-automated steam-electric power generating units to be built in the United States.

PERMANENT FINANCING

The Company obtained $29,325,000 of new money in January 1959 through the sale of 500,000 shares of common stock. (In January 1960, $30,000,000 of mortgage bonds were sold to repay $23,000,000 in short-term bank loans borrowed in December 1959; the balance will be used to partially finance construction in 1960.)

*EARNINGS PER SHARE

Consolidated earnings per share were $3.82 and $3.74 in 1959 and 1958 respectively.

DIVIDENDS

The Company and its predecessors have a record of continuous dividend payments extending back to 1907 on the common stock and to 1896 on preferred stock. The current dividend on the common stock and original preferred stock, which participates with the common, is equal to $2.60 a share on an annual basis.

CONDENSED CONSOLIDATED BALANCE SHEET Dec. 31, 1959

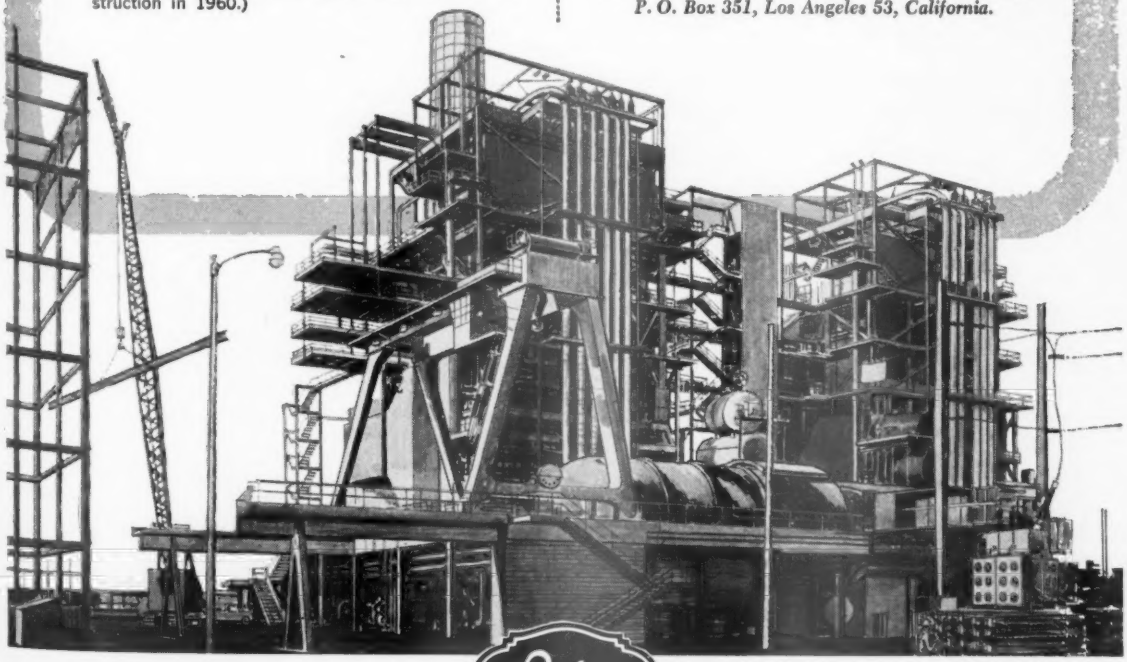
ASSETS

Electric Plant	$1,145,622,713
Investments and Other Assets	18,511,250
Current Assets	81,560,978
Deferred Charges	2,688,621
Capital Stock Expense	3,487,115
Total Assets	$1,251,870,677

LIABILITIES

Stated Capital and Surplus	$ 556,463,507
Long Term Debt	537,433,100
Current Liabilities	116,289,103
Deferred Income Tax Reserve	20,130,473
Other Reserves and Liabilities	21,554,494
Total Liabilities	$1,251,870,677

For a copy of Southern California Edison's 1959 Annual Report write: A. L. Chavannes, Secretary, P. O. Box 351, Los Angeles 53, California.



SOUTHERN CALIFORNIA Edison EDISON COMPANY

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Rift in AFL-CIO Widens

Split between industrial and craft unions grows as Plumbers and their chief withdraw from IUD. Other groups usually tend to follow 250,000-member unit.

The schism between AFL-CIO's industrial and craft unions broadened still more this week. Not unexpectedly, the crafts' Plumbers & Pipe Fitters announced withdrawal from the Industrial Union Dept. of the federation, effective the end of this month. The Plumbers' Pres. Peter T. Schoemann resigned as a vice-president of IUD at the same time.

The withdrawal does not affect the craft union's status in AFL-CIO. Schoemann continues as a vice-president of the federation. Only the Plumbers relationship with the sprawling IUD is involved. Even so, the action is causing new worries in AFL-CIO.

• **More Feuding**—The Plumbers & Pipe Fitters is one of the crafts' most important unions. Others are inclined to follow what it does. For this reason, the union's withdrawal from IUD isn't being taken lightly by anyone. It increases the crafts-industrial union tension. It could lead to even more separation of the two rival, jurisdiction-jealous groups—and more feuding.

The architects of labor's unity in AFL-CIO, the result of the AFL and CIO merger late in 1955, already are "profoundly disturbed" by serious arguments that are continuing.

Recently, Albert J. Hayes, president of the International Assn. of Machinists, warned that internal disputes in AFL-CIO are threatening "the very foundations of the federation."

Referring to the dispute in February that led to this week's move by the Plumbers to quit the IUD, Hayes said:

"In almost every meeting of the executive council of the AFL-CIO since the merger, some dispute . . . has caused serious argument and difference in the council's debate. Although a few problems have been solved . . . the major ones are yet unsolved. All of the efforts of the AFL-CIO executive council have failed to resolve them."

• **Hayes' Warning**—Hayes has been in the fore of those trying to find a formula for settling the crafts-industrial union rivalry over jobs—a rivalry made complex by involvement of labor traditions, opposed philosophies of unionism, and economics.

What he considered a sound and simple formula—for arbitration of internal disputes that can't be settled otherwise—was suggested last September at AFL-CIO's biennial convention in San Francisco. There wasn't a dissenting vote when a committee was instructed to "perfect the plan . . . so that it could be submitted to a special convention" for adoption early this year.

Between September and February, strong opposition to the arbitration plan developed in the Building & Construction Trades Dept. The latter—the fortress of the crafts—advised the AFL-CIO executive council that an arbitration procedure recommended to it was not acceptable (BW—Feb.20'60,p139).

Hayes commented glumly earlier this month, "If I may venture a guess, it now appears very doubtful that any sensible solution will be found in these major problems of the federation which are gnawing at its very foundations."

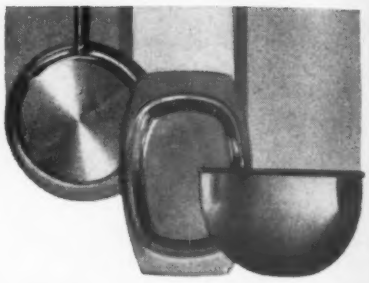
• **Ups and Downs**—Since Hayes' pessimistic words, the Building & Construction Trades Dept. modified its position somewhat. Its leaders recently issued a statement that said its affiliates "are not opposed to the use of arbitration in the settlement of inter-union disputes, provided there are sufficient and effective safeguards to protect the interest of . . . this department in an equitable manner."

The statement said that "whatever machinery is ultimately established must deal with disputes—and disputes only—and cannot be vested with authority to pass upon basic jurisdiction of trade unions." It added that final agreement on arbitration would have to depend on "the scope and the limits of the matters to be arbitrated."

If the indicated easing of some of the craft's opposition to arbitration cheered federation leaders, the Plumbers & Pipe Fitters withdrawal from IUD depressed them again.

During the AFL-CIO executive council meeting, IUD leaders held a caucus in Miami Beach on a number of matters involving conflict between the industrial unions and the crafts. Schoemann, as an IUD vice-president, was present. Walter Reuther, president of IUD, asked him to leave because of his conflict of interests; Schoemann as a craft unionist is active in leadership areas of the Building Trades.

Schoemann made clear that under the circumstances he and his union could hardly remain in IUD. A number of other craft unions in IUD have warned since that if they are to be barred from IUD councils, there's no point in staying in the department. If others go, there's a danger of IUD becoming more militant for industrial unionism—and the war with the crafts might turn from cold to hot. END



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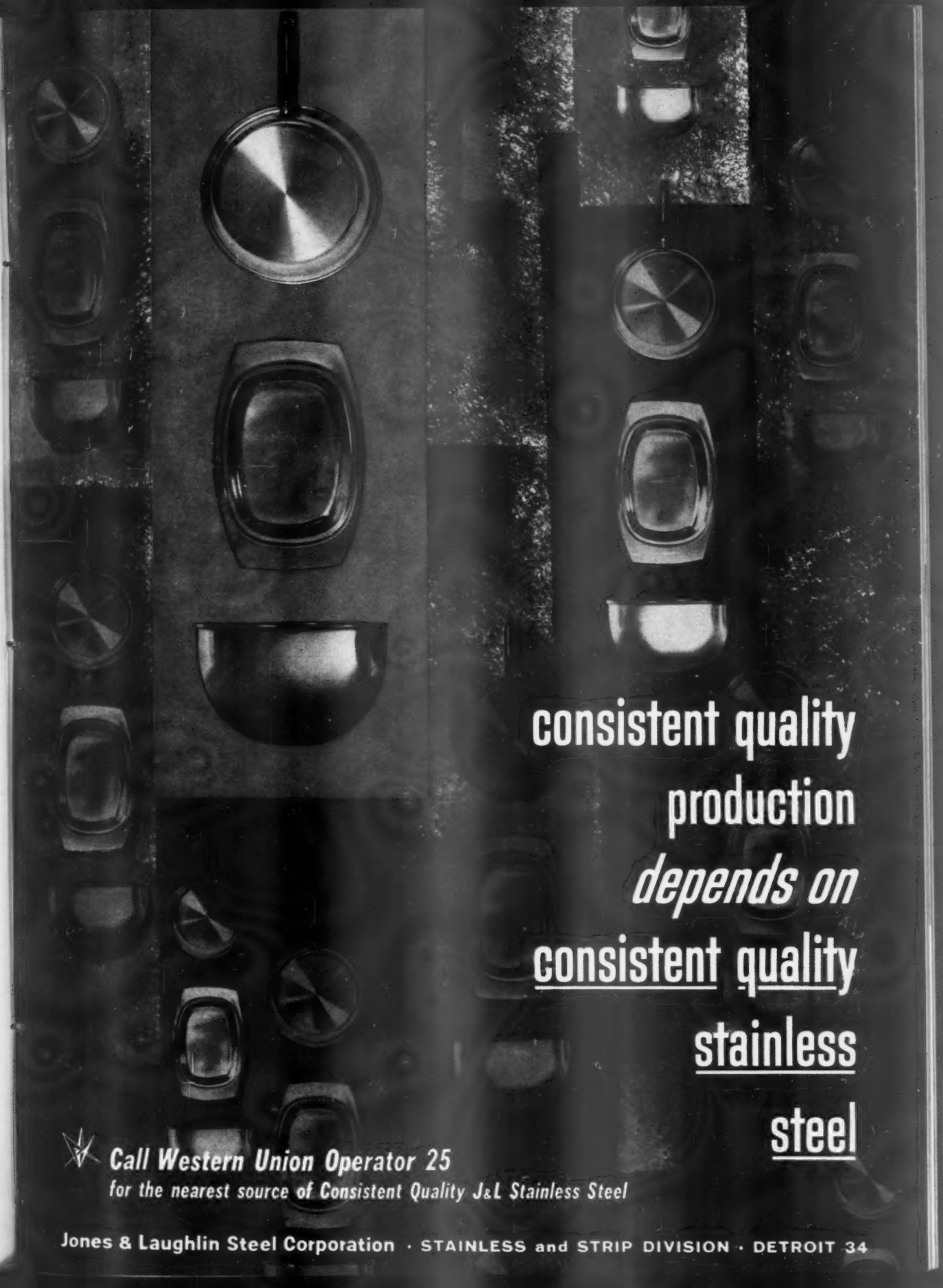
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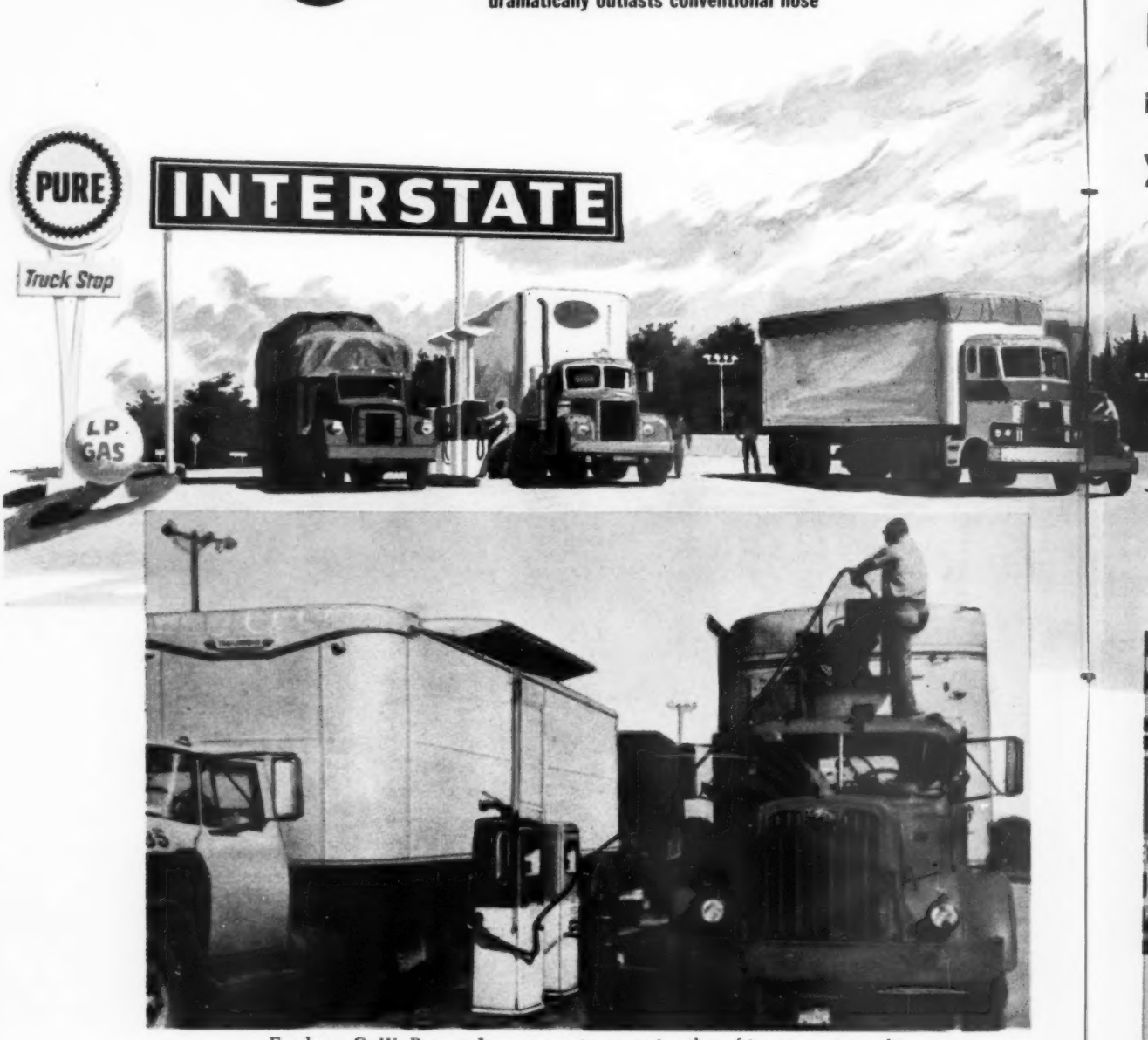

Employee C. W. Brewer, Jr. gasses motor powering the refrigerator unit on this reefer truck, demonstrating why pumps must use 18' lines.

James W. Harper is manager of Interstate Truck Terminal (Ulmer, S. C.). The place boils with activity 24 hours a day, 7 days a week. More than 50,000 trucks and 20,000 passenger cars a year are fueled. Some of the busiest pumps have served 50 trucks in a 24-hour period.

"This hose stands up under the most severe type of service. Trucks run over it and there is constant abrasion and squeezing, but there is no leakage. **Although the hose we've used in the past lasted only 6 weeks, U.S. Royal Wire-braided Gasoline Hose has lasted 7 months so far and is still as sturdy as ever.**" This kind of service under these conditions explains why U.S. Royal Gasoline Hose outlasts, outperforms and lowers operating expenses. You can't beat the "U.S." special construction features. Approved by Underwriters Laboratories.

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Big 12-pump gas station (one of the busiest in the East) fuels over 70,000 vehicles a year with U.S. Royal® Gasoline Hose

Interstate Truck Terminal, Ulmer, S. C. This station has 12 pumps. Restaurant and store are in background; shower, sleeping quarters, lounge and barbershop for truck drivers are in area at right. Photo shows five trucks and one passenger car being serviced at one time.

Attendant fills truck tank with U. S. Royal Hose. Note extreme flexibility and ease of handling.

(at left) Station Manager James Harper shows how previous hose at left was flattened and cut when truck ran over it. **U. S. Rubber hose at right, which has been run over repeatedly, still remains in perfect shape.**

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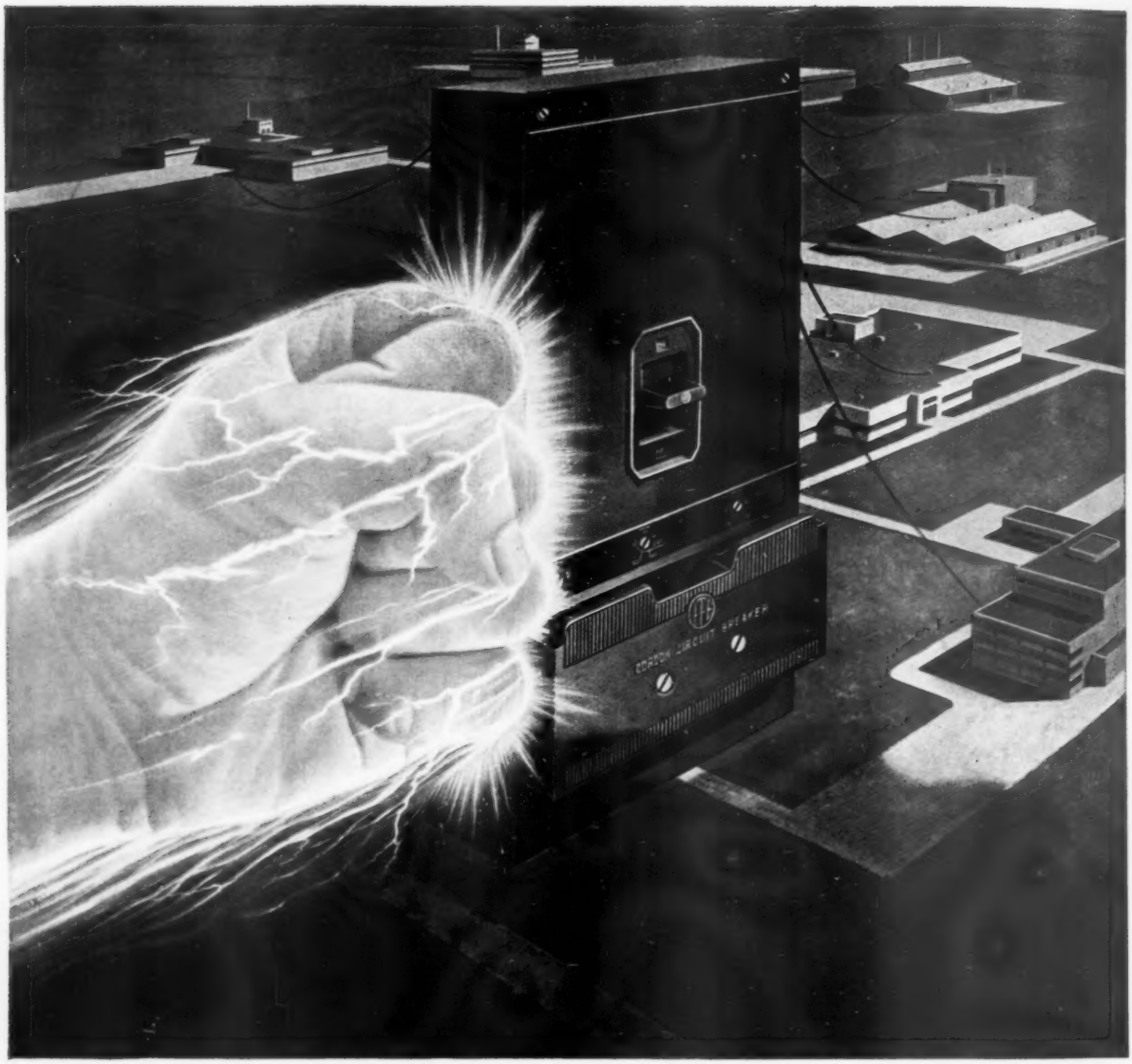

A smooth path for normal electric currents, the I-T-E Cordon circuit breaker becomes an impassable barrier to heavy, smashing slugs of power. Here, artist Ned Seidler paints the Cordon in its vital protective role.

TAMES THE TERRIBLE POWER OF ELECTRICITY

Behind nearly every electric circuit in factory, school and store lurks considerably more power than is used. Big power demands a circuit breaker with big protection built into it. Otherwise a simple short circuit could cause spectacular fireworks and damage. Against this risk, I-T-E developed its "Cordon®" circuit breaker . . . capable of interrupting up to 100,000 amperes in only 1/240 second. If accidental short circuit opens the gates to a damaging flood of electric current, the "Cordon" quickly shuts them . . . faster than an eye can blink. Yet the "Cordon" fits into only half the space required by traditional devices. And it costs a third less. This new and advanced solution to an important electrical problem is typical of the electrical progress that comes continually from I-T-E. In countless other ways, the products of I-T-E help make your electricity more useful, more dependable and more efficient.

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I-T-E CIRCUIT BREAKER COMPANY

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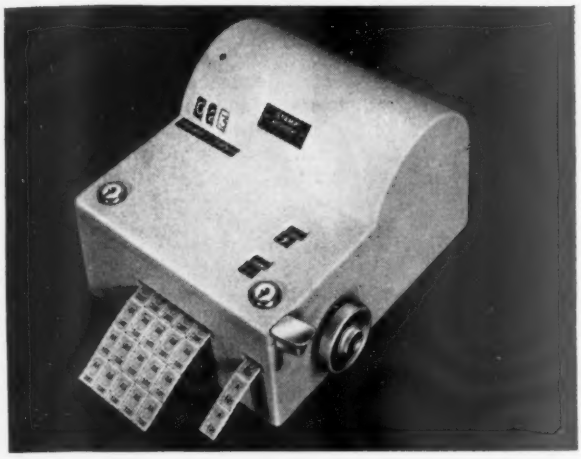

Dispenser Does the Cashier's Chore Of Counting Out Trading Stamps

Trading stamp dispensers such as the one above aim to relieve stamp-giving retailers of a major headache: the fuss and feathers involved for the checkout girl who has to figure out the number of stamps to give a customer, and count them out by hand.

The dispenser shown is the product of Stamp Audit Co., a new company, of Glendale, Calif. The cashier turns the dial at the right till the indicator at the top shows the amount of the customer's purchase; the machine feeds out the right number of stamps. The cashier then presses the cutter bar, and shears off the stamps.

After a few weeks of production, the company reported it had received orders for 500 machines from retailers who want to try the machine out. Price of the device is under $100.

Meanwhile, Kroger Co. and Top Value Enterprises are testing another device, Dial-a-Stamp, in Cincinnati. This machine, made by Automatic Stamp Machine Co., of Dallas, resembles a telephone dial. The cashier dials the amount of the cash purchase, and the right number of stamps comes out.

National Cash Register Co. has a dispenser under development, is testing an engineer's model in Jackson, Miss. This one works with some of National's own cash registers. It is not yet in production.

• • •

TV Editorial, Pay-TV, Station Scramble Keep Industry in State of Uproar

Reports, programs, attacks, and counterattacks continue to keep the world of television on the front pages—and in an uproar.

• CBS this week offered to New York's Mayor Wagner equal time to rebut a program over CBS-TV last week which editorially attacked off-track betting.

MORE NEWS ABOUT MARKETING ON:

• P. 64—George Katona pins his faith on consumer attitudes as a vital economic force.

The original program itself was a departure, in that CBS-TV for the first time devoted time to taking an editorial stance on "important public issues."

At the same time, Merle S. Jones, president of CBS Television Stations Div., announced a series of programs, to be broadcast over CBS-owned stations, called "Reviewing the Press." Jones stated that the stations do not plan to indulge in criticism of competing media, but, he added, "We might want to make some observations regarding the size of type, the headline, and front page position given by some newspapers over the past two or three months to the affairs of Dr. Finch and Carole Tregoff."

• On the pay-TV front, the Center for the Study of Democratic Institutions of the Fund for the Republic released a sizzling size-up of the pay-TV controversy. It charged that both the networks—opposed to pay-TV—and the proponents have "so misrepresented and obscured the real issues that an intelligent decision has been made almost impossible for millions of set owners or for the FCC itself."

The report, To Pay or Not To Pay, was written by Robert W. Horton, former Washington newspaper correspondent. It restates charges of lobbying and untoward pressure on Congress by the networks—charges that the FCC said were unfounded. It charges, on the other hand, that pay-TV interests have handled the matters of fees in "vague and contradictory terms" and have been evasive on the point of advertising. FCC was caught in the middle, the report states—and the public's right to make up its own decision had gone down the drain.

• Meanwhile, Toronto is the scene of another battle. Nine applicants there are competing before the Board of Broadcast Governors for a license for the one new independent station. Such a station is regarded as a plum, which might bring in some revenue now going to U.S. stations.

• • •

Marketing Briefs

The Boston Store, major Milwaukee department store, opened a self-service branch in a new shopping center—complete with checkout counter and carts. The branch sells basement merchandise plus notions, drugs, soft-goods, books, toys, and seasonal lines. All departments are self-service except hosiery, cosmetics, jewelry, and shoes.

Two new associations highlight today's competitive times. Last week the tricot fabric industry organized the **Tricot Institute of America,** with Charles E. Lovett, of Deering, Milliken & Co., as acting president. Two weeks ago, the discounters officially launched the **National Assn. of Discount Department Stores,** with Steve Masters, of Masters, Inc., as chairman of the 12-man board of directors.

The Consumer Calls the Tune

He's a powerful economic force, George Katona says, and by no means the easy mark that some say.

No mere marionettes dangling at the end of economic strings, U. S. consumers are a major force whose spending decisions are vital in determining what happens to business. What's more, these decisions are often made without regard to levels of income or other economic factors. They are based, rather, on consumer attitudes and expectations. It is possible to measure these attitudes and thus to predict, well in advance, shifts in economic trends.

That, in capsule, is the major thesis of George Katona's new book, The Powerful Consumer (McGraw-Hill, $6.50). As he puts it: "It is a major thesis of this book that the willingness to purchase durable goods may decline at a time of relatively high and stable incomes and may usher in a recession."

• **Man Who Knows**—Katona (picture, below), program director at the Survey Research Center at the University of Michigan, is the high priest of economic psychology, being both an economist and psychologist himself.

Since 1946, he and his staff have carried on periodic surveys of consumer attitudes for the Federal Reserve Board and for private business. Others have picked up the idea in various forms, including the National Bureau of Economic Research. Later this year, the Census Bureau will start regular quarterly surveys, taking over the work for the FRB previously handled by the Survey Center.

• **How Valuable**—However, many economists question the value of consumer surveys. They say surveys have little predictive value but simply record what everybody knows—or, at least, what economists can readily learn from observing changes in statistics. Others insist that it is impossible to devise interviews that will elicit the true intentions of consumers—in fact, consumers themselves don't do much planning, so they can't tell you what they will do.

The late Charles Roos, an economist noted for the application of mathematics to economic analysis, wrote in a review of business forecasting in Econometrica, a professional quarterly: "The most favorable criticism that can be made is that data on intentions to buy should be used with considerable caution." He admitted, though, that Katona's work has at times registered notable successes in predicting a turn in the economy.

• **Katona's Points**—In The Powerful Consumer, Katona argues that consumer attitudes can indeed be accurately measured and that these attitudes often run counter to, or ahead of, changes in the economy. Thus, they themselves help to bring about the changes, he says.

But Katona's book is much more than an academic argument about a system of business forecasting. It is also a profile of the consumer and the way he acts in the kind of high-consumption era we have been enjoying for two decades.

In fact, Katona plays the role of the defender of the American consumer. Directly and indirectly, he attacks the popular thesis, set forth most dramatically by Vance Packard in his Hidden Persuaders, that the consumer is an easy target of manipulators. Rather, says Katona, there is ample evidence of the "common sense and even high intelligence of the average consumer."

The consumer's attitudes, he says, are formed from personal experience, associations in his social group, and what he learns in the mass media. These attitudes aren't based on whimsy, nor are they subject to propaganda.

GEORGE KATONA, in new book, upholds the value of consumer attitude surveys.

I. How Good a Sign?

Katona doesn't pretend that consumer attitudes alone are the determining factor in whether the economy goes up or down.

"The starting point in any analysis of consumer demand," he says, "must be the enabling conditions represented by income, assets, and debts, as well as by such demographic facts as population growth and the age distribution of the population."

Katona wouldn't deny the importance of business capital spending as a force on the business cycle. But he argues that consumer spending on durable goods is independent of capital spending. Moreover, since consumer action establishes levels of demand, such spending can help determine capital spending plans of business.

Business capital spending plans have long been measured by surveys and accepted as an indicator of things to come. Katona says consumer surveys are equally, if not more, important and accurate.

• **Discretionary Power**—Because of the kind of economy we live in, says Katona, a large and important part of consumer buying power can be spent or withheld, depending on how consumers feel. This discretionary income or buying power (credit) has become so large, and is shared by so many people, that what happens to it can make the difference between recession and prosperity.

Katona attempts to destroy Lord Keynes' argument that, because most people always spend in much the same way, income alone determines what happens to the economy. That may have been true 50 years ago, he says, when the great majority of people spent their income for the simple needs of existence—food, shelter, and clothing. But today a good share of their spending can be deferred.

It is this deferrable spending that Katona's book and his survey work deal with. The power to buy or not to buy automobiles, appliances, or houses is the economic whipsaw held by consumers and is the basis for the title, The Powerful Consumer.

• **What Does It Prove?**—Does he prove his case for economic psychology as a tool for forecasting? That is for the reader to determine. Katona himself admits that, in stable times, consumer attitude surveys may reveal only the obvious things about the economy. They may be unable to detect minor variations in the trend.

But the Survey Center is proud that it seems to have foretold some of the more important ups and downs of business since the end of World War II. Or, at least, consumer surveys confirmed the trends shown by other leading indicators.

• **In 1948-49**—As one instance of suc-

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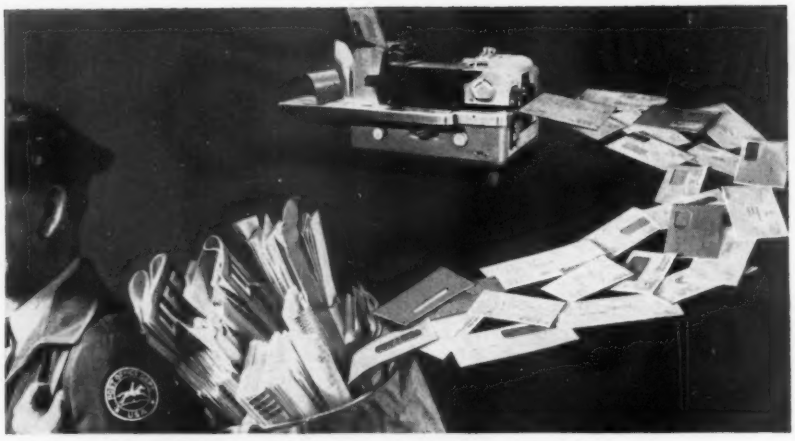

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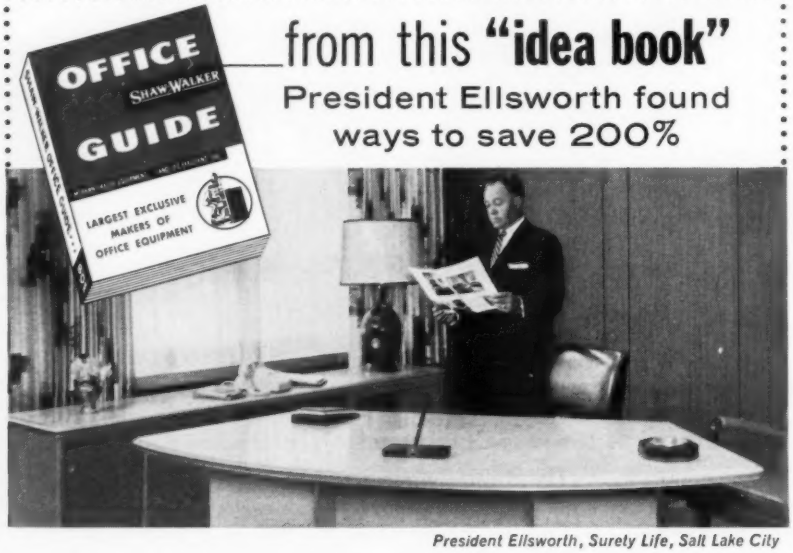

from this "idea book"

President Ellsworth found ways to save 200%

President Ellsworth, Surety Life, Salt Lake City

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cess, Katona cites the first postwar bobble in 1948-49. Economists, he says, were predicting in the fall of 1948 that the expected postwar depression was about to start. However, his surveys showed that people were optimistic.

"A friend," writes Katona, "aware of the factual economic picture at the time, looked askance at the survey results and advised the author to save his reputation and refrain from publishing them."

Despite production cutbacks, higher unemployment, and a decline in personal income in the spring of 1949, people continued to spend on automobiles, appliances, and houses, as the Survey Center results had predicted.

"The predicted depression didn't come off," says Katona. He reminds the reader of a statement by the Dept. of Commerce, commenting on the recovery in January, 1950: "The most important area of stability throughout 1949 was in the consumer sector of the economy."

• **In 1953-54**—Again, in 1953-54, signs abounded that economic activity was going to decline. After the sharp price increases caused by the Korean War had leveled off, people became adjusted to the new level of prices and, despite declining incomes, were satisfied with conditions. It was a time to buy. They did so, and the 1953-54 recession was "recorded in economic annals as one of the mildest ever experienced." Dire predictions by such economists as Colin Clark failed to materialize.

By the fall of 1954, people were in a strong buying mood. They launched what was to become in the following year the biggest automobile sales record in history. Why? Prices and credit terms, Katona thinks, were the governing factors. In the case of appliances there was the widespread and rapid growth of discount houses. Then, too, there was the extension of credit terms on auto installment purchases (which reduced downpayments and monthly terms). Both things cut the outlays that consumers had to make. They became convinced that it was a good time to buy.

As early as June, 1954—even before there were any strong signs of an upturn in some of the traditional economic indicators—surveys by the Survey Research Center showed healthy optimism on the part of consumers (BW–Jul.31 '54,p60).

• **In 1957-58**—Conversely, Katona says his survey work successfully predicted at an early date the recession of 1957-58, the steepest in the postwar period. As far back as June, 1956, one of Katona's periodic surveys noted that consumers were less than exuberant. By October, BUSINESS WEEK's analysis of the Survey Research Center report

WHAT'S THE GOOD WORD

about the new Call Director telephone?

Businessmen everywhere are praising this versatile, new equipment. For example...

E. E. Price, President, MacMillan Oil Company of Florida, Inc., Hialeah, Florida: "We are very pleased with our new Call Director and intercom telephone system. Incoming and interoffice calls can now be handled far more quickly and efficiently since we have two separate channels of communication to use at all times. I know we have improved our customer relations and increased our sales as well, thanks to the Call Director."

Vernon Tock, Business Manager, Carle Hospital Clinic, Urbana, Illinois: "We have 88 Call Director telephones in our new clinic building. Previously, with our large volume of incoming calls, each doctor had to have two phones on his desk, plus other space-consuming equipment. Now one Call Director serves him, and lets him take calls on any one of ten lines. The Call Director has enabled us to streamline our entire routine for handling patients' calls. We're very enthusiastic about it."

Stuart Armstrong, Assistant Vice President and Manager, The Bank of Douglas, Tucson, Arizona: "We accepted your proposal to use Call Director telephones to get the added business lines and extension stations our growing branch bank needed. As a result, our service to our customers has noticeably increased—and we are operating with greater convenience, efficiency and speed. Our thanks to your company and to the Call Director."

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BW-326

characterized consumers as "zestless" (BW–Oct.13'56,p171).

• **Detects Swings**–Katona doesn't contend that consumer attitude surveys can accurately measure, in hard figures or percentages, the magnitude of a change in the economy. If attitude swings are large, however, it is likely that a substantial change is forthcoming. But, most important, accurate pulse-taking of consumers can indicate a change in the direction of the economy. After all, Katona says, that is what is most important in business planning and national policy.

II. The Consumer Today

Whether or not you accept Katona's arguments, attitude surveys provide researchers with valuable information about the way people form opinions and how they act in an age of plenty.

Much of his book is devoted to description of the modern consumer. It is his contention that the American people, after many years of depression, have become prosperity-minded.

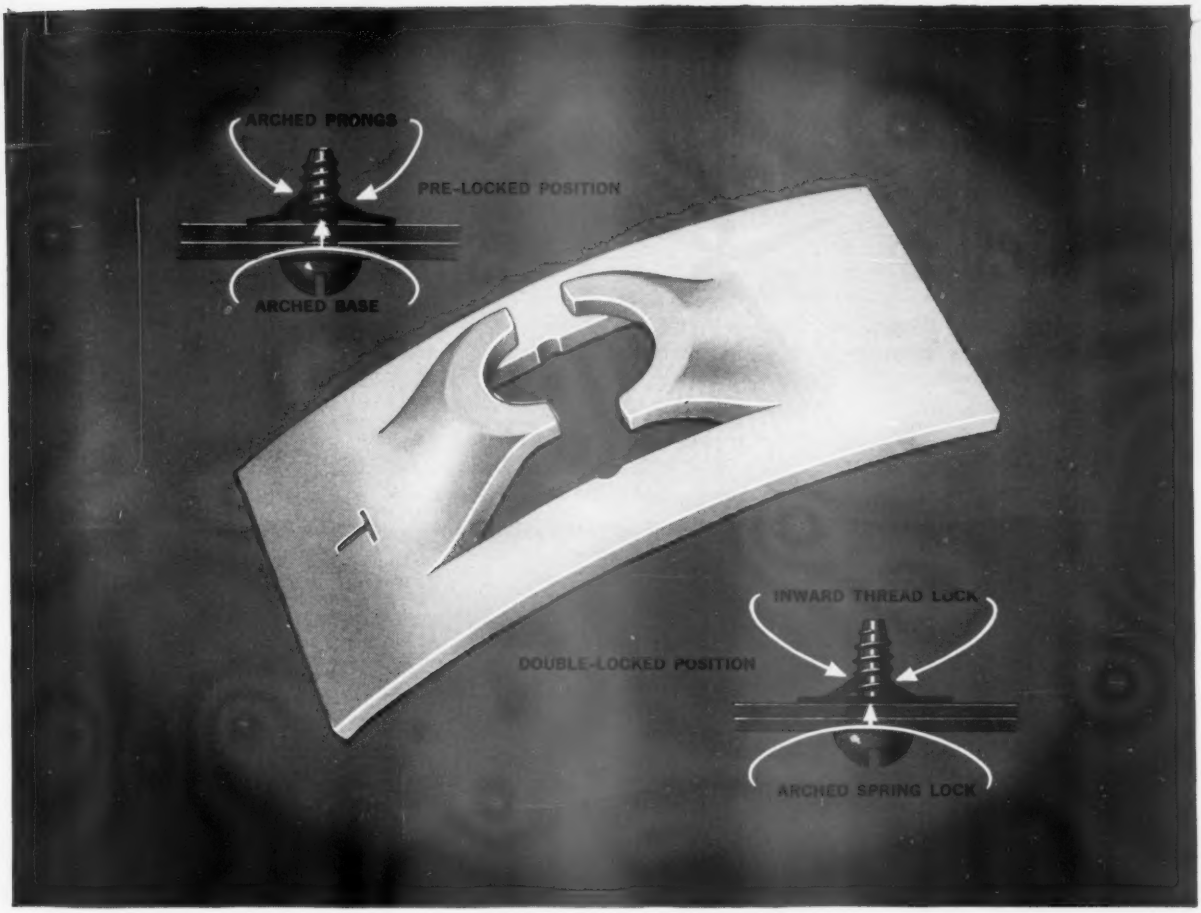
• **New Psychology**–This, Katona thinks, has been one of the major features of the postwar period, and the big underlying reason why postwar recessions have been short-lived. The depression psychology of the 1930s was left behind with the war.

True, consumers did amass a lot of liquid assets during the war. But it is neither assets alone nor income alone that determines the way people spend. In fact, Katona says, liquid assets in the hands of consumers, though far greater than they were prior to the war, have not declined in any year since 1946. So it wasn't the spending of those assets that has sustained buying.

Nor does Katona go along with the idea that a great pent-up demand for consumer durable goods has been solely responsible for our high consumption. He disagrees with the Cassandras who foresaw the 1957-58 recession as a sign that consumers are sated with goods and are turning their attention elsewhere. In fact, he says, that isn't the way things work at all.

• **High Goals**–He views America as an aspiration-oriented economy. Rather than becoming satiated, high-spending consumers are fulfilling aspirations, and the knowledge that one can fulfill his aspirations in turn creates new aspirations.

The reverse of this thesis, of course, is that unfulfillment of aspirations–the frustration of not being able to buy the things you want–has a deterrent effect on people's optimism or hope, hence lessens the goals they set. Thus, a depression psychology can feed on itself. This might well be one explanation for the unrelieved length of the Great Depression. **END**



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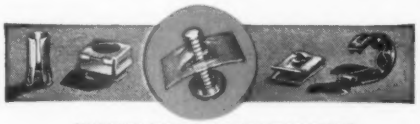

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brightest star in steel

HIGHLIGHTS

from the Annual Report to Stockholders:	1959	1958
Net Sales	$112,944,477	$45,804,182
Net Income	$14,175,678	$1,064,697
Earnings per share*	$3.97	$.30
Working Capital	$46,555,927	$39,258,423
Shareholders' Equity per share	$18.13	$14.10
Production rate: Steel ingots	93.9%	48.1%

**Adjusted for stock dividends*

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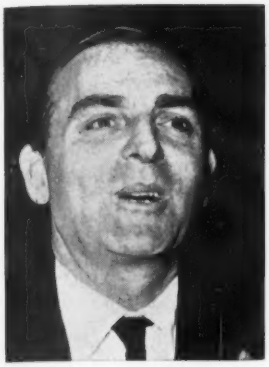


Martin Revson Asks $601,460 in Suit Against Brother in Stock Dispute

The feuding Revson brothers, (pictures) Charles, president of Revlon, Inc., (right) and Martin (left), former executive vice-president, have joined battle again. Martin has sued Charles and Revlon for $601,460 in damages. He charges that Charles Revson induced him, through misrepresentation, to exchange "discounted" shares of Schering Corp. for Revlon stock he held before leaving the cosmetics company two years ago.

The $601,460 that Martin Revson now seeks is, he claims, the value of the Schering stock he should have received instead of the 78,461 shares of Schering he did get.

The new disagreement between the Revsons dates to 1955, when the Revson brothers made an agreement to put Revlon stock in a voting trust with Charles Revson as the sole voting trustee.

In 1958, when Martin Revson resigned, the brothers agreed to a stock deal in which everyone—including Revlon—seemed to profit. **Martin Revson exchanged 100,000 shares of Revlon's Class B common for Schering Corp. stock,** which Revlon had been acquiring as an investment. (Revlon, among other things, thus reaquired stock—for use, say, in stock options—at what might be looked on as a bargain price.) **In his complaint, Martin Revson now says that he was short-changed some $3 a share.**

Charles Revson called the filing of the suit "most regrettable," adding that "it should be clear that the suit is for money damages and does not relate to questions of management or ownership of the company."

• • •

Some Companies See Profit Prospects Less Rosy Than Sales and Earnings

Although first-quarter corporate sales and earnings reports are generally good, some corporations are sounding a few dour notes—raising doubts about how profitable 1960's prosperity will be.

International Harvester Co. says that sales so far in its fiscal year—which ends Oct. 31—have failed to meet expectations, particularly in farm tractors. Top officials, in fact, now are hedging earlier predictions that 1960 will be a record year, and Pres. Frank W. Jenks says that "even if we equal the sales of 1959, we might not be able to earn an equal profit." He attributes this to higher prices of purchased goods and wage increases.

Eaton Mfg. Co., while pointing to higher sales and net for the first quarter of 1960 over 1959, says "the rate of improvement during the past week or so has not been as pronounced as the gains previously shown." The auto parts maker said that the company had witnessed some reductions in new orders as customers adjust inventories to production.

Maytag Co.'s first-quarter sales and earnings also haven't been up to expectations. An official explained that retail stocks of appliances were apparently higher at the end of the steel strike than had been realized.

• • •

Some Bank Consumer Credit Plans Fizzle, Mostly From Lack of Controls

Bankers last year fell over themselves to launch new consumer credit plans (BW—Mar.7'59,p55), but now they feel the rush may have been too fast. This was clear last week at the American Bankers Assn.'s annual installment credit conference in Chicago.

Many banks admitted being hard hit by delinquencies, defaults, and bankruptcies.

Most banks that started charge account banking or revolving credit check lines last year will stick to them. A few even report better earnings from revolving credit lines, for example, than from any other type of consumer loan. But some admit to being hooked badly; these are either searching for an out or have already closed up their open charge plans.

Most bankers come to the conclusion that installment credit plans will continue to grow, but that some plans already established will be curtailed. In addition, many banks plan stricter controls on how much a customer may borrow—and what he does with the money.

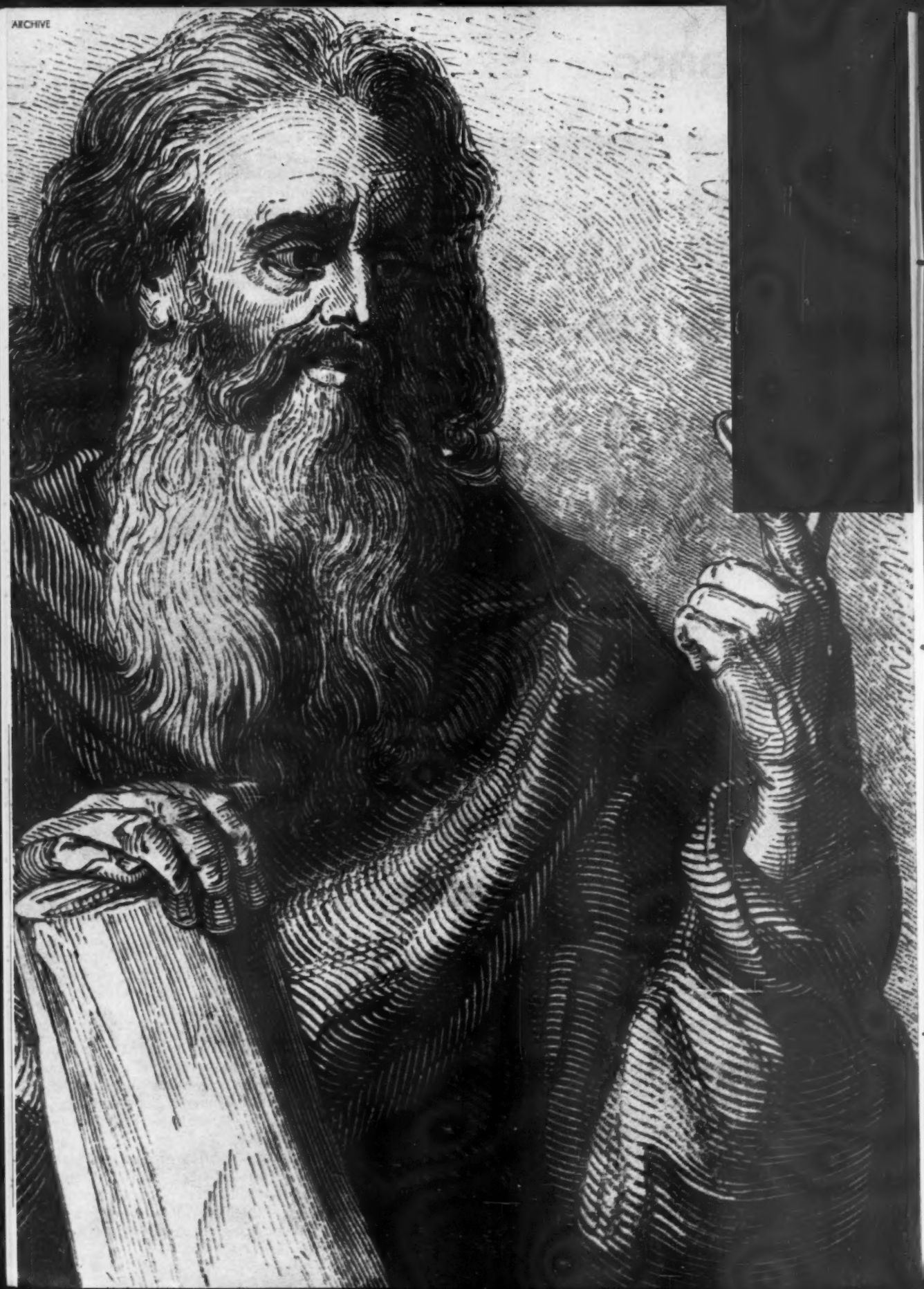
• • •

Norfolk & Western, Nickel Plate Discuss Merger, Though They Don't Link Up

Fresh from absorbing the Virginian Ry. two months ago, the Norfolk & Western Ry. turned this week toward merger talks with another profitable line, the New York, Chicago & St. Louis—the old Nickel Plate. **Officials of both roads confirmed the talks, but said at this stage the merger is "wholly speculative."**

The surprising thing about the news is that the two rails do not connect, which leads some rail analysts to figure that the savings from such a venture might not be so great as, say, the once-talked of merger between Nickel Plate and Chesapeake & Ohio—a pet project of the late Robert R. Young.

The new talks jack up the number of rails exploring mergers to at least 20. Just last week, plans to merge three Canadian-Pacific-controlled lines were announced (BW—Mar.19'60,p38), and three other industry mergers—involving some 15 rails—are being discussed.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BASIC PRODUCT of semiconductor industry is the transistor, accounting for half of sales. This is a Motorola mesa transistor, magnified 25 times, of a type well suited to mass production under close control.

BUSINESS WEEK REPORTS ON:

Semiconductors

● Transistors and their brethren—the tiny electronic devices known as semiconductors—were invented little more than a decade ago.

● But already 90-odd companies develop and manufacture them. Annual sales run to half a billion dollars. The take may well double in another two years.

● Semiconductor devices are far outstripping the exploits of an earlier wonder child of electronics—the vacuum tube. They go into everything from midget radios to giant computers.

● One long-established company—Bell Telephone Laboratories—wrote almost all of the industry's basic recipes, yet the sales leader is an independent outfit that started virtually from scratch.

● The industry's story is an exciting drama of breakthrough after breakthrough—by perhaps the fanciest assembly of brains any business has ever known.

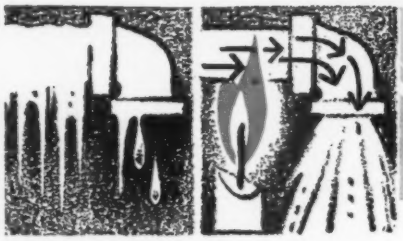
A DOZEN years ago, a team of physicists at Bell Telephone Laboratories tossed some dice to electronics manufacturers and started a scramble the likes of which even that volatile industry had never seen. The "dice" were the first transistors—tiny chips of specially prepared germanium metal that demonstrated a new way to control and amplify electrical signals, the most basic job performed by any kind of electronic equipment.

This year, transistors and kindred devices are selling at an annual $500-million clip, and there are predictions of a $1-billion rate by 1963. The business is popularly known as the semiconductor industry, because its products are made from semiconductors, a group of materials with electrical characteristics that can be tailored to control electrical current in a particular way; the products themselves are often called semiconductors, too.

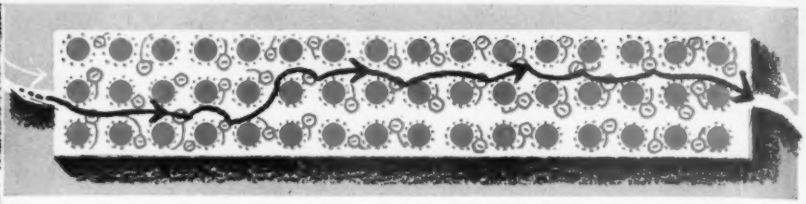
• **Growing by Innovating**—The first transistors launched a chain reaction of new products and technological discoveries that are making semiconductors the dominant force in the $10-billion electronics industry—and significant in the electrical equipment field as well. Manufactured goods using semiconductor components—from midget portable radios to giant computers—are the biggest, fastest growing segment of the market for new electronic equipment.

In only 12 years, the semiconductor industry has accomplished enough to rank it, probably, as the world's fastest growing big business. Not only that—it is an almost classic example of the particular kind of growth that technological innovation can fire up throughout the U. S. economy (BW—Jan.23'60,

NO BIGGER than a pea, this RCA transistor—shown during assembly—can work the miracle of electronics: controlling and amplifying a signal, perhaps thousands of times.



CONDUCTOR (COPPER)

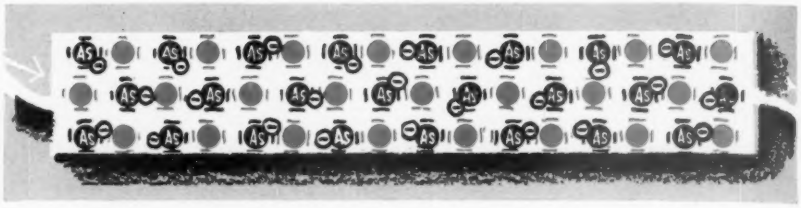


What Is a Semiconductor?

Current flows through an electrical conductor such as copper (top, right) like water through a pipe. The "water" in a copper wire is electrons that are very loosely bound to the copper atoms. An electrical potential pushes electrons in one end of the wire, and these push other electrons out the other end.

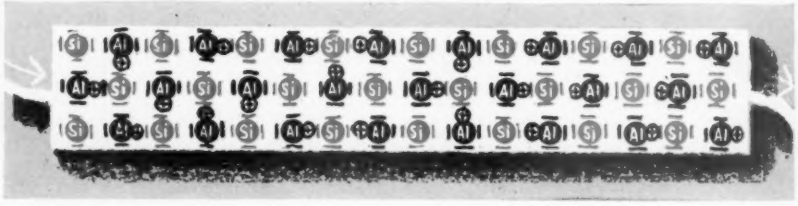
By contrast, a semiconductor such as pure silicon ties up its electrons more securely — like a pipeful of water that has frozen. However, if the electrons are loosened by heating or adding energy in the form of light, they will flow through a semiconductor like current in an ordinary conductor.

A semiconductor's ability to carry current depends partly on impurities in the material. Different impurities produce different kinds of conduction; the difference between the two kinds shown at right is basic to all semiconducting devices.



N-TYPE SEMICONDUCTOR

An n-type semiconductor contains a trace of an impurity whose atoms carry an extra electron. Here the semiconductor silicon, with four electrons, has been doped with arsenic, with five electrons — only four of which fit in the tight crystal structure. The extra arsenic electron is available to carry current in much the same manner as the loosely bound electrons in a good conductor such as copper.



P-TYPE SEMICONDUCTOR

A p-type semiconductor contains an impurity that has one less electron. In this silicon crystal, the impurity is aluminum, which has three electrons. Since aluminum has one too few electrons to fit neatly in the crystal, it leaves a hole. The holes are roughly equivalent to positive charges and will absorb an electron, then reappear. Electrons jumping from hole to hole, so to speak, carry current through the semiconductor. Putting n-type regions and p-type regions in the same crystal of semiconductor is the basis of most devices.

p52). The growth has been achieved through systematic research and development, with results often far removed from the original R&D goals.

But having to depend on innovation for growth makes it tough for businessmen to chart a course. That's why the semiconductor industry, important and exciting in its own right, is also a meaningful case history for executives in any business.

SEMICONDUCTORS

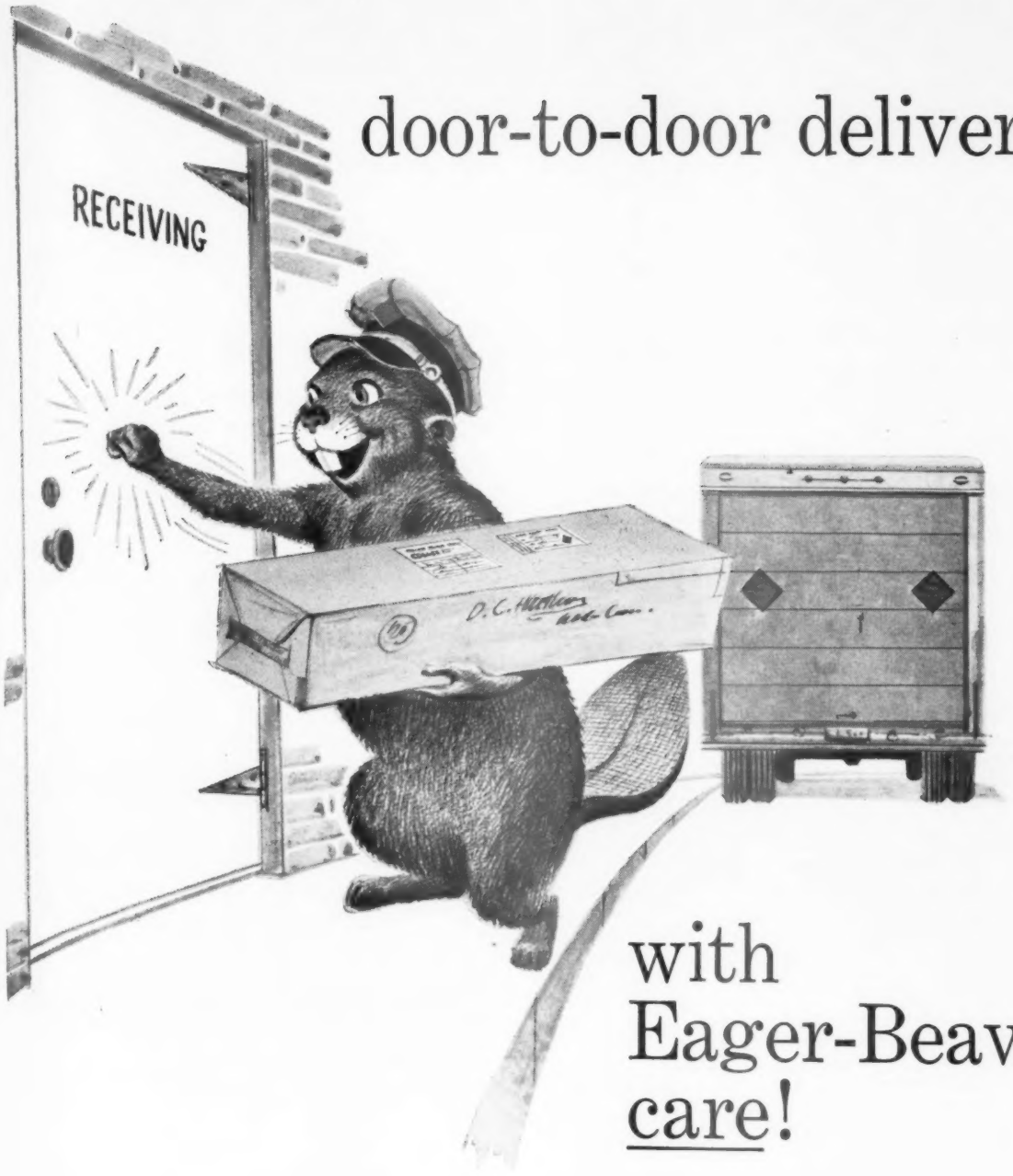
WALTER H. BRATTAIN, 58, is the only one of the three co-inventors of the transistor still at Bell Labs. He shared in the 1956 Nobel Prize for the discovery.

• **One Cookbook**—The industry has another distinction in the way it grew. The technical knowhow for all its strides stems basically from the same source: "Mother Bell's Cookbook." Bell Labs made its early findings about semiconductors readily accessible to outsiders, and fledgling companies were able to refine or add to Bell's recipes and make a lot of money fast from the improvements, before the competition caught on, too. This pattern of innovation, profit, imitation has made continuing innovation all the more vital to the young industry, and a number of companies have started from nothing and fattened by following it.

Solution to a Crisis

Before semiconductors came along, the electronic industry faced a crisis. In the words of Dr. Daniel Noble, executive vice-president of Motorola, Inc. (BW—Feb.27'60,p137), "equipment had to have so many components

door-to-door delivery



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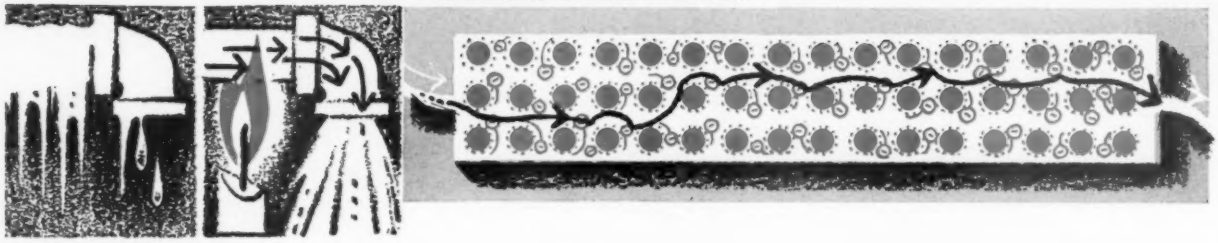
NO BIGGER than a pea, this RCA transistor—shown during assembly—can work the miracle of electronics: controlling and amplifying a signal, perhaps thousands of times.

CONDUCTOR (COPPER)

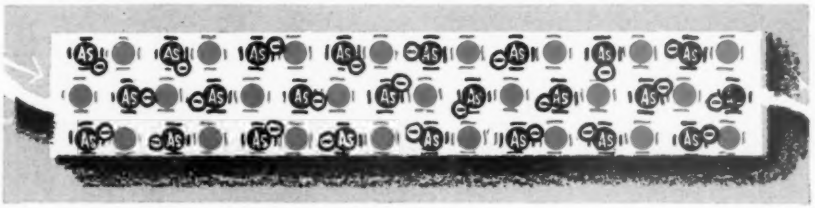


What Is a Semiconductor?

Current flows through an electrical conductor such as copper (top, right) like water through a pipe. The "water" in a copper wire is electrons that are very loosely bound to the copper atoms. An electrical potential pushes electrons in one end of the wire, and these push other electrons out the other end.

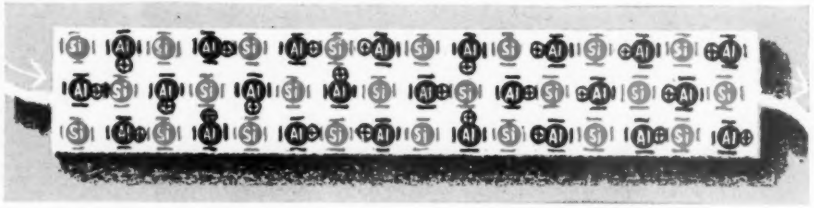
By contrast, a semiconductor such as pure silicon ties up its electrons more securely — like a pipeful of water that has frozen. However, if the electrons are loosened by heating or adding energy in the form of light, they will flow through a semiconductor like current in an ordinary conductor.

A semiconductor's ability to carry current depends partly on impurities in the material. Different impurities produce different kinds of conduction; the difference between the two kinds shown at right is basic to all semiconducting devices.



N-TYPE SEMICONDUCTOR

An n-type semiconductor contains a trace of an impurity whose atoms carry an extra electron. Here the semiconductor silicon, with four electrons, has been doped with arsenic, with five electrons — only four of which fit in the tight crystal structure. The extra arsenic electron is available to carry current in much the same manner as the loosely bound electrons in a good conductor such as copper.



P-TYPE SEMICONDUCTOR

A p-type semiconductor contains an impurity that has one less electron. In this silicon crystal, the impurity is aluminum, which has three electrons. Since aluminum has one too few electrons to fit neatly in the crystal, it leaves a hole. The holes are roughly equivalent to positive charges and will absorb an electron, then reappear. Electrons jumping from hole to hole, so to speak, carry current through the semiconductor. Putting n-type regions and p-type regions in the same crystal of semiconductor is the basis of most devices.

p52). The growth has been achieved through systematic research and development, with results often far removed from the original R&D goals.

But having to depend on innovation for growth makes it tough for businessmen to chart a course. That's why the semiconductor industry, important and exciting in its own right, is also a meaningful case history for executives in any business.

• **One Cookbook**—The industry has another distinction in the way it grew. The technical knowhow for all its strides stems basically from the same source: "Mother Bell's Cookbook." Bell Labs made its early findings about semiconductors readily accessible to outsiders, and fledgling companies were able to refine or add to Bell's recipes and make a lot of money fast from the improvements, before the competition caught on, too. This pattern of innovation, profit, imitation has made continuing innovation all the more vital to the young industry, and a number of companies have started from nothing and fattened by following it.

Solution to a Crisis

Before semiconductors came along, the electronic industry faced a crisis. In the words of Dr. Daniel Noble, executive vice-president of Motorola, Inc. (BW—Feb.27'60,p137), "equipment had to have so many components

SEMICONDUCTORS

WALTER H. BRATTAIN, 58, is the only one of the three co-inventors of the transistor still at Bell Labs. He shared in the 1956 Nobel Prize for the discovery.

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of limited reliability that the total system's reliability was zero—it wouldn't work." But, compared to the vacuum tubes that were frequently used in such systems, semiconductor components are cheap, small, simple, long-lasting, and much more reliable—at best, several magnitudes more so than all but the most expensive tubes.

Transistors, the best known of these components, last year accounted for slightly more than half of the industry's $400-million sales (up from $228-million in 1958). Two other components approximately split the balance of 1959's semiconductor sales: rectifiers—devices that let current pass in one direction only and are most commonly used to convert alternating current to direct current—and diodes, which are low-power rectifiers used as one-way electrical gates at signal-power levels.

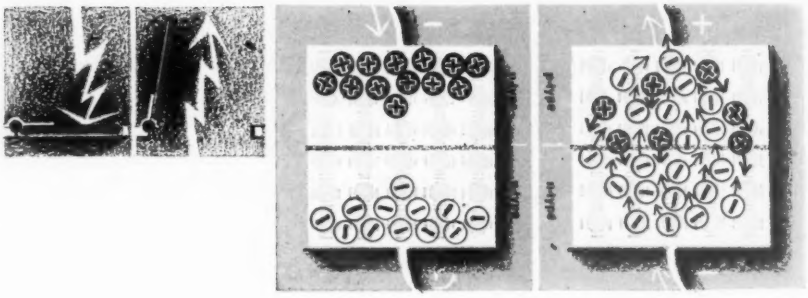
• **Who Buys What**—The military now gives the new industry about half of its sales income, and this market will continue to grow. A single missile may carry as many as 6,000 transistors, and its control equipment may contain tens of thousands more.

On the civilian side, electronic controls are just beginning to open as a market. They are vital to computers, virtually all of which use semiconductor components. A small computer has 1,000 or more transistors and several times as many diodes within its anatomy; a really big one may contain several hundred thousand such devices.

Among consumer goods, all portable radios are transistorized, and transistorized table radios are gaining popularity. Portable transistorized TV sets are in production, and standard TV sets will probably switch to semiconductor parts when prices dip a little more. But the market has only started to grow.

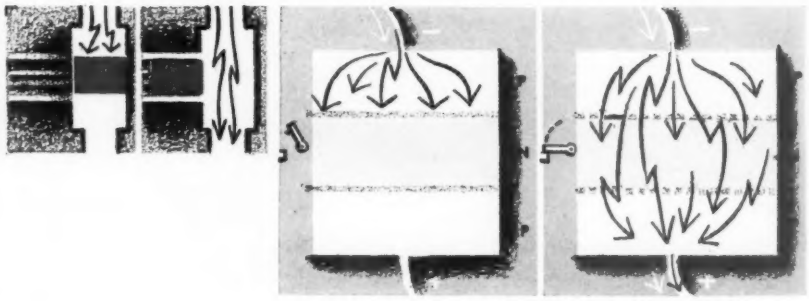
• **Like but Unlike**—The boom in semiconductors has often been likened to an earlier phenomenon in electronics: the excitement that followed the discovery of the vacuum tube. But the analogy is inexact. True, most transistors still do jobs similar to those assigned to vacuum tubes. A transistor radio looks just like a tube radio in miniature. Because of transistors' virtues of small size and low power drain, they have been substituted for tubes wherever costs and technical factors permit. And this change has opened a market that enabled transistor makers to move quickly into high-volume operations yielding profits to finance the really revolutionary developments just now taking shape.

But transistors are not tubes. The resemblance ends with the similarity of certain jobs both can do. In 10 years transistors shot to a stature it took vacuum tubes 40 years to reach. There is practically no replacement market for transistors, since they seldom wear



What Is a Diode?

A diode is a one-way electrical gate. Inside a semiconductor crystal containing an impurity, there is an area or "junction" where the impurity changes from n-type to p-type (diagram, page 76). In this area, current in one direction puts a negative charge on the p-type crystal and a positive charge on the n-type crystal. This pulls the holes and extra electrons that would function as conductors away from the junction area and prevents current flow. But when the current is reversed, the holes and extra electrons flow toward the junction and combine, permitting current to pass.



What Is a Transistor?

A transistor looks like a sandwich and behaves like a valve.

It has three layers: The two outer layers are either both p-type or both n-type (diagram, page 76); the center or base layer is the opposite type, but with only enough impurities added to make it slightly so.

No current can flow from the top to the bottom layer. The reason is that it is blocked by the junction between the center and bottom layers; in this junction area, the holes and extra electrons that otherwise would act as conductors are forced apart, just as in a diode (above)

But injecting a small current into the center layer increases the number of free holes or electrons in the center, and these create a bridge across the resisting lower junction. The bridge permits a much larger current to flow from top to bottom than is injected into the center. This phenomenon, known as amplification, can increase a small current up to 40,000 times.

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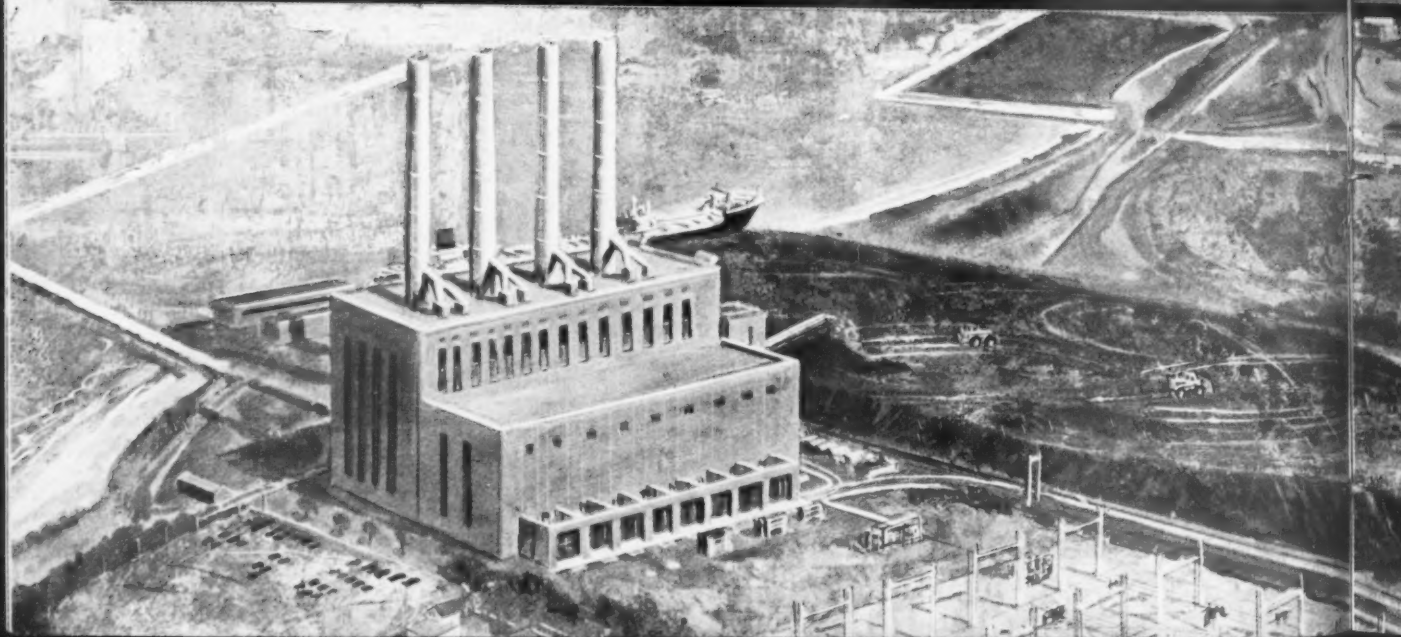

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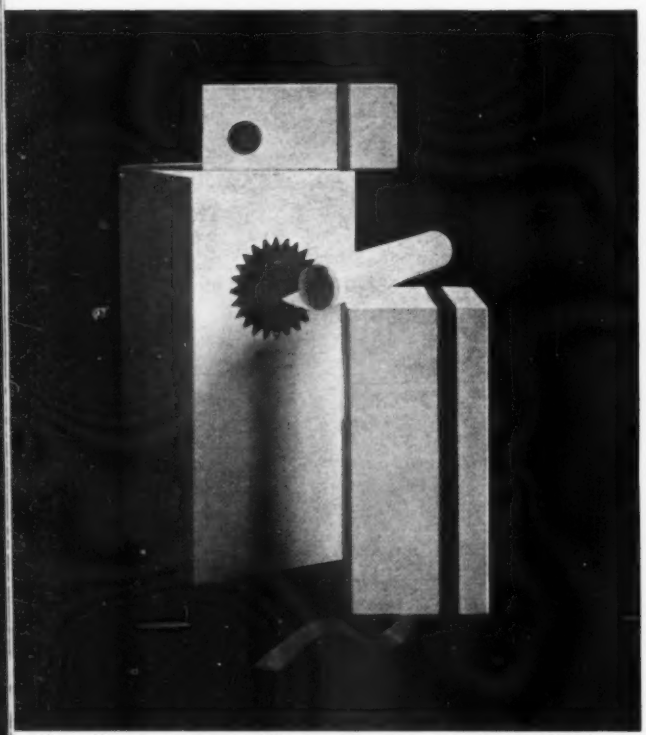

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CYANAMID

LEO (left) and DAVID BAKALAR are founders and still 87% owners of Transitron Electronic Corp., Wakefield, Mass., close to top in the semiconductor industry in sales. Started in 1952, Transitron stock is now valued at more than $300-million on the market.

out; replacements account for something approaching half of tube sales. Transistors work differently, and they are set up on different types of circuits. And it takes different technologies to produce transistors and tubes.

Perhaps the most striking evidence of the gulf between transistors and tubes is that the nation's No. 1 and 2 makers of semiconductor devices—Texas Instruments, Inc., and Transitron Electronic Corp.—attained their leads without ever turning out a tube. And although most major tube manufacturers at the outset made and marketed semiconductor devices within their tube divisions, they soon suffered some severe cases of indigestion. As a result, such companies as General Electric, RCA, Raytheon, and Sylvania have divorced the two and set up completely autonomous semiconductor operations.

Agents of Revolution

Although transistors and tubes can do some of the same jobs, a transistor is a strikingly different item. Transistors and other semiconductor devices can tackle tasks that require many thousands of units in one system. Such jobs would be utterly impractical with tubes. Their talents are such that many scientists and engineers rate transistors as one of man's greatest technological ideas.

It's not hard to see why. Semiconductor devices make it possible to design and build computers with the logical capacity of the human brain. They are vital ingredients in designs for missile control systems that can be stored three years or more and still be ready instantaneously. They go into intricate networks of controls that, for the first time, are reliable enough to run a steel mill, a utility, or an entire chemical complex.

• **Solid Circuits**—In time, semiconductor devices may do even more to revolutionize the electronic industry. One way they will do this is by eliminating interconnections — the points most likely to fail in a complicated electronic system. Some transistors are already more reliable than a soldered electrical connection between two copper wires. In time, semiconductors will transform a radio chassis from a collection of separate parts into a single solid chunk about the size of an after-dinner mint, containing many circuit elements combined in modular form with a minimum of interconnections. Westinghouse Electric Corp.'s Semiconductor Div. contracted with the Air Force early this year to design just such a communications receiver, and commercial versions will undoubtedly follow.

Circuits arranged in this way are often called circuit functions or "solid state" circuits. Solid state is a term sometimes used incorrectly as a synonym for semiconductors, but solid state devices are any elements that can control current without moving parts, heated filaments, or vacuum gaps; all semiconductors are solid state devices, but some solid state devices, such as transformers, are not semiconductors.

• **Change in Marketing**—Solid circuits will probably be cheap enough to throw away if one of the sealed segments goes bad. But failure will be much less likely than in the best of today's electronic devices, since there's nothing to wear out in transistors or in the circuits utilizing them.

The advent of solid circuits in quantity will upset some of the familiar marketing patterns in electronics. A computer maker will no longer buy a dozen or so different kinds of components—transistors, capacitors, resistors, and so on—from different manufacturers and then hook them together. Instead, he will be able to order a "bistable amplifier" or a "flip-flop circuit" ready-made in a package the size of one of today's transistors. Just this week, the first commercial versions of such devices were offered by Texas Instruments.

• **Vision**—These circuits will be vastly important, particularly in big computers and complex control systems. But semiconductors will be taking on other assignments, too, in fields such as refrigeration and power generation. And as they become more and more adept at handling large amounts of power, they will be controlling more big electric motors and doing other chores that take muscle as well as speed.

The Brainiest Industry

Although the first practical transistor appeared 12 years ago, the semiconductor industry as such is really only nine years old. It took three years

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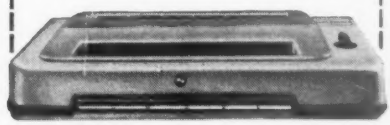

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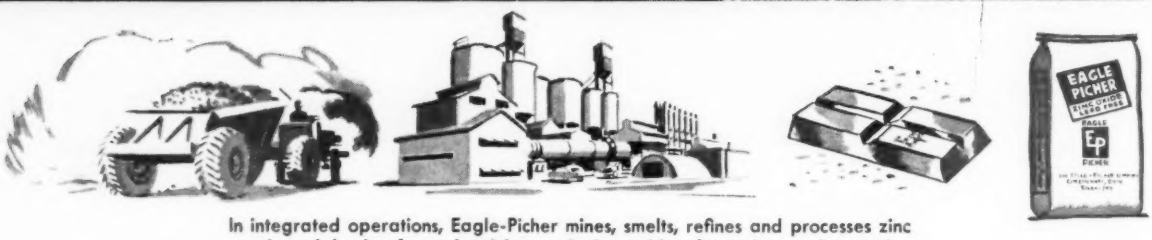

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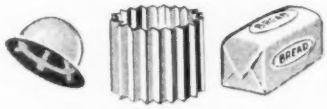

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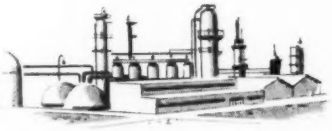

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Two Bell Labs alumni now with Sylvania Electric Products are J. EARL THOMAS, 42 (left), director of research and engineering, and W. J. PIETENPOL, vice-president and general manager of the Semiconductor Div. Both are Ph.D.'s. Pietenpol, after three years at RCA, became director of development for semiconductor devices at Bell. Thomas has taught at MIT and Wayne State University.

to groom the components to graduate from the labs.

In its short life, it has attracted 90-odd companies in the U.S., including all the integrated electronic giants on the one hand and small-scale speculative ventures, reminiscent of those that sprang up in the early days of the vacuum tube, on the other. Of the 90 or so companies, only about 35 are significant producers; of the rest, some are still working in the laboratory, some are in pilot production, and some are very marginal operators.

There's no doubt that the industry will soon dwarf the business of manufacturing vacuum tubes. But it's impossible to predict which of the 90 companies will survive—or which will emerge on top. Already, some very solid newcomers have appeared, including Texas Instruments and Transitron, and it's a safe bet that they and the large diversified electronic corporations will stay in the forefront.

• **Brains, Not Brawn**—Since they all lean so heavily on research, the companies are all long on brains, short on brawn. It doesn't take much capital to get into the business. And technical changes come so fast that it usually doesn't pay to invest heavily in plant and equipment; they would soon be obsolete.

The swift changes have another effect: Industry rankings are shuffled from week to week. And new products pour out in such a flood—hundreds a month at times—that technical bulletin departments look like the city room of a daily newspaper.

So the best investment is in brains—in metallurgists, physicists, chemists, and, most sought after of all, in the rare hybrid scientists who can act as bridges between specialists in such diverse fields as crystal metallurgy, surface chemistry, electronic physics, and circuit design. Top management abounds in Ph.D.s. (Some of the industry's brainpower is shown in the pictures beginning on page 76.)

• **Furrowed Brows**—The brains who run the semiconductor industry have had some pesky problems. The young giant is stumbling all over itself in a rush to expand. The most common sales tactic is the price cut (unit prices in any established line tend to fall a disconcerting 30% a year), and it's fortunate for the marketing men that volume keeps climbing. Talent is scarce, and competitors continually raid each other's ranks. Limited funds for research and development have to be stretched over broad areas. Vested interests resist innovations. Even experts can't hope to keep up with all developments in the field.

On the fringes of the industry, the grapevine spreads misinformation wildly. The boom has attracted its share of job jumpers, fast-buck operators, and unscrupulous promoters.

• **Maturity Ahead?**—At the same time, the industry is showing at least two signs that maturity may be approaching. The number of companies is beginning to level out. And, for the first time, one really satisfactory production technique has been made available—one that will increase yields, cuts costs, and improves quality.

Another current trend is vertical integration. Makers of electronic gear are going into semiconductor components, and some successful component manufacturers, such as Texas Instruments, are doing the reverse.

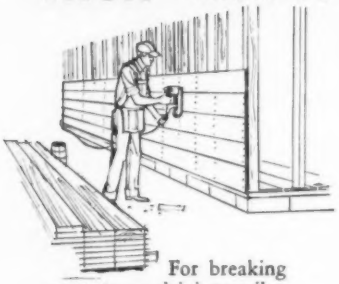
For the companies that moved fast enough, there have already been rich rewards. In almost every case, they owe these rewards to the basic recipes that came out of "Mother Bell's Cookbook." For a real understanding of the semiconductor industry and its technology, sometimes bewildering to the outsider, it's necessary to look in some detail at the fascinating story of how that cookbook was compiled.

Basic Research Builds an Industry

Like many of science's recent achievements, the development of semiconductor devices wasn't the personal drama that led to, say, James Watts' steam engine. Instead, it was more akin to du Pont's attack on polymer chemistry that created nylon and other synthetics. The transistor, like nylon, was the product of some basic, purposeful digging into the unknown—in this case, into the properties of semiconducting materials. The digger was the Bell Telephone Laboratories.

The search for the transistor was a

building men know...



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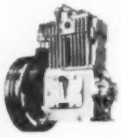

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SEMICONDUCTORS

ROBERT N. HALL, 41, research physicist at General Electric, developed indium-germanium junctions and the so-called "rate growing" process for making grown junction transistors. He is another Cal Tech physics Ph.D.

race against time to remove the greatest single threat to the Bell telephone system. By the mid-1940s, that system was exploding in complexity and size. It was outgrowing the limits of components such as relays and electronic devices using conventional vacuum tubes. By switching from manual to automatic exchanges in the 1930s and 1940s, telephone companies had solved one labor and cost problem by eliminating central operators. But the new electromechanical monster needed many skilled, expensive maintenance crews to keep it running.

The telephone system simply needed a new kind of switch—one that wouldn't wear out and could be produced at reasonable cost.

• **Beginnings**—The first step toward that goal, though no one realized it at the time, was taken early in 1940 in the office of Mervin J. Kelly, then president of Bell Labs. Russell S. Ohl, a staff member working with silicon metal (one of the most common semiconductor materials), demonstrated an unusual photoelectric cell made from pure silicon.

Until that time, photocells had operated on the electrical effect produced by the interaction of the surfaces of two different metals exposed to light. Ohl's cell, by contrast, generated current in a single piece of metal—and the current was about ten times stronger than usual.

One of the witnesses at the demonstration, as it happened, was Walter H. Brattain. Sixteen years later, he and two fellow physicists—William O. Shockley and John Bardeen—received the Nobel Prize for their work with transistors.

Crossing the First Frontiers

It took many years to build enough knowledge of semiconductors even to predict a device that could amplify or switch current. The research team at Bell Labs had to break unknown ground in metallurgy and chemical analysis and to do some abstruse theorizing in quantum mechanics.

The puzzle suddenly fit together in 1947. In November of that year, Bardeen and Brattain produced a low-frequency amplifier by immersing a piece of silicon in a salt solution. In doing so, they demonstrated a theory developed by Shockley on space charges. The next stride came only a month later, after the team had switched from silicon to germanium, another common semiconductor material, but one that is easier to handle. Brattain then noted the first amplifying, or "transistor," effect that existed in a solid semiconductor.

In June, 1948, the transistor made its official debut to the Bell Labs staff, the press, and the military.

• **How It Worked**—The first devices were "point contact transistors," so called because they consisted simply of two sharpened wires pressed into a piece of germanium. In the transistor's passive state, almost no current would flow through the germanium between the two pointed wires. But if a tiny current were introduced into the germanium by a third wire, the electrical resistance between the two point contacts would virtually disappear. Then a much larger current could conceivably flow between them.

This simple phenomenon is the basic magic of electronics: A small current can control a larger one. This process can go on in successive stages, almost as fast as a streak of light, until a tiny original signal has been multiplied millions or even billions of times and can do dozens of jobs—vibrating the cones of loudspeakers to produce sound or turning on a rocket motor or changing the direction of a missile far out in space.

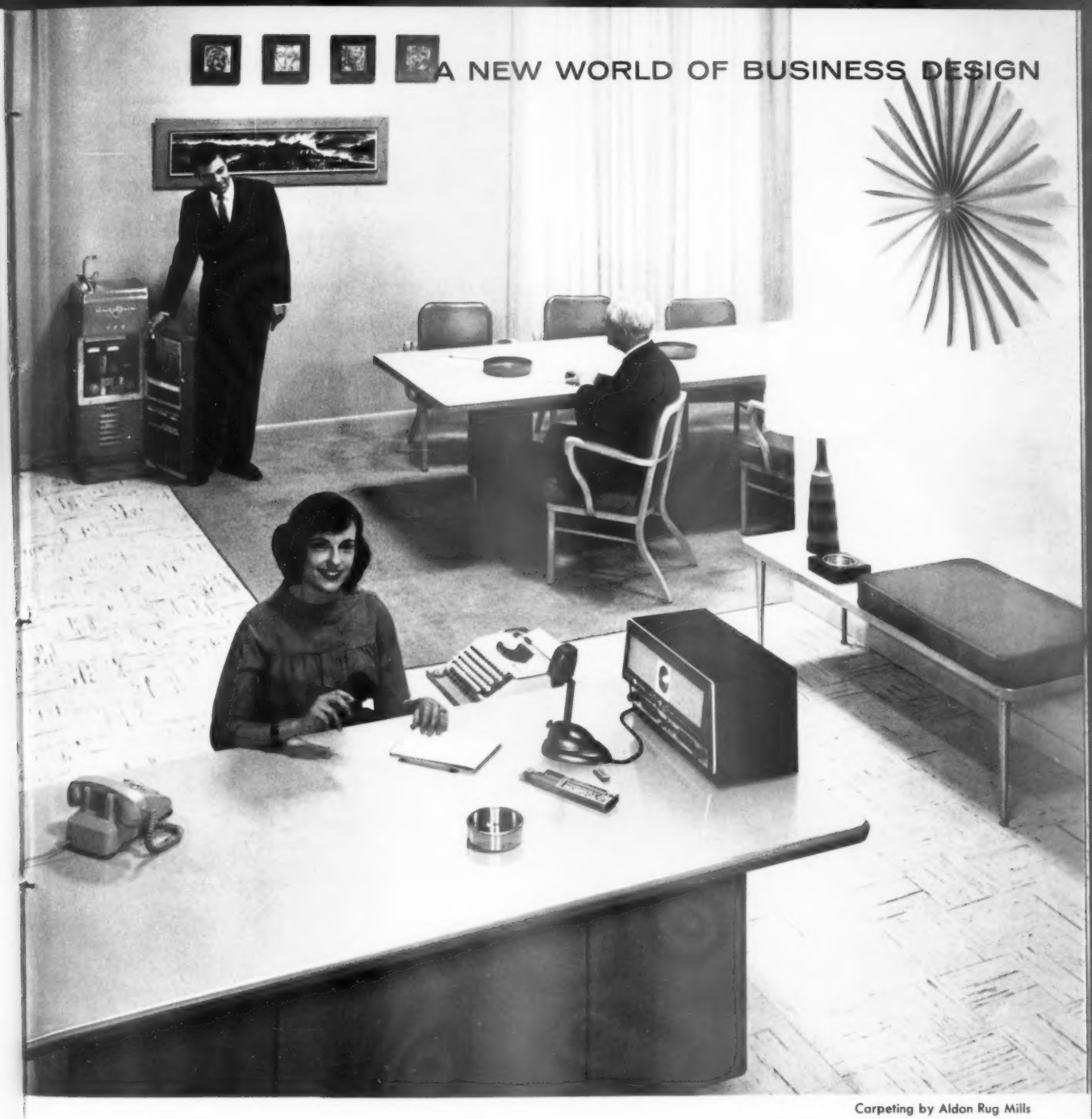
• **Still Imperfect**—The point contact transistor was a partial answer to the need for a better switch. The device looked simple; it had no parts to wear or burn out, and it was incredibly small. But, electrically and mechanically, it was weak and fragile. Its noise limited its use as an amplifier. It could do only a few of the jobs that were easy for vacuum tubes or relays, and this limited its applications.

Besides, Bell Labs' physicists didn't really understand why a point contact transistor worked. Until the answer was found, production of the devices was doomed to remain a chancy business—some in a batch would work, some wouldn't, and no one knew why. It was doubtful whether high-volume, close-tolerance production was possible at all.

Nevertheless, point contact transistors were produced. The good ones

SEMICONDUCTORS

JACK A. MORTON, 46, may hold the key job in the entire industry—vice-president of Bell Telephone Laboratories. He directs the industry's largest research effort and coordinates relations between the lab and its licensees.



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GENERAL ELECTRIC
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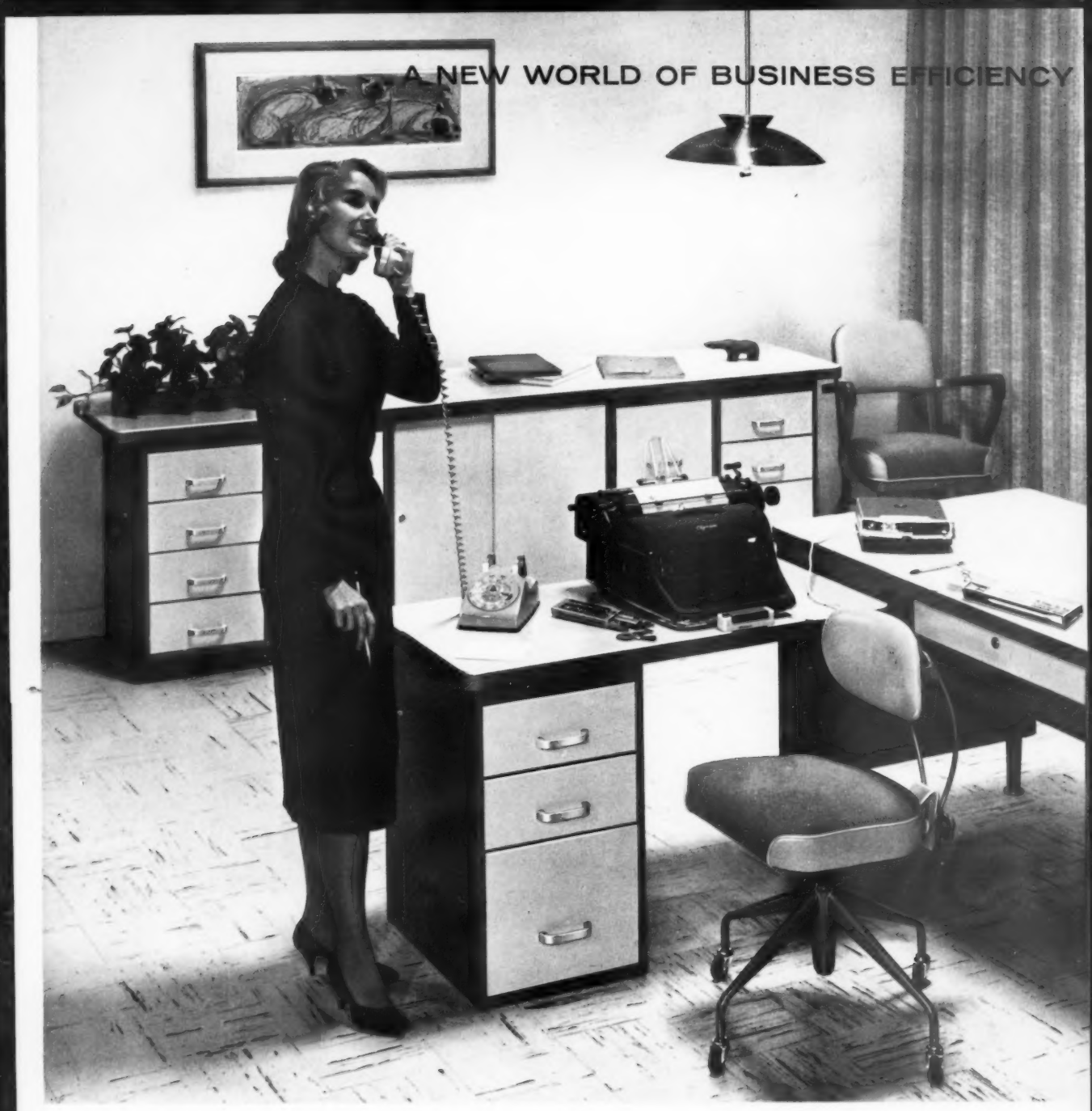
Smart people these, with Eberhard Faber Mongol pencils at hand—for doodle lovers and note takers alike. And when it's "typing time" . . . that sleek, handsome Olympia Precision Portable will make short work of all the notes, memos and reports!



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"They're on the road—now I'll get my work done."

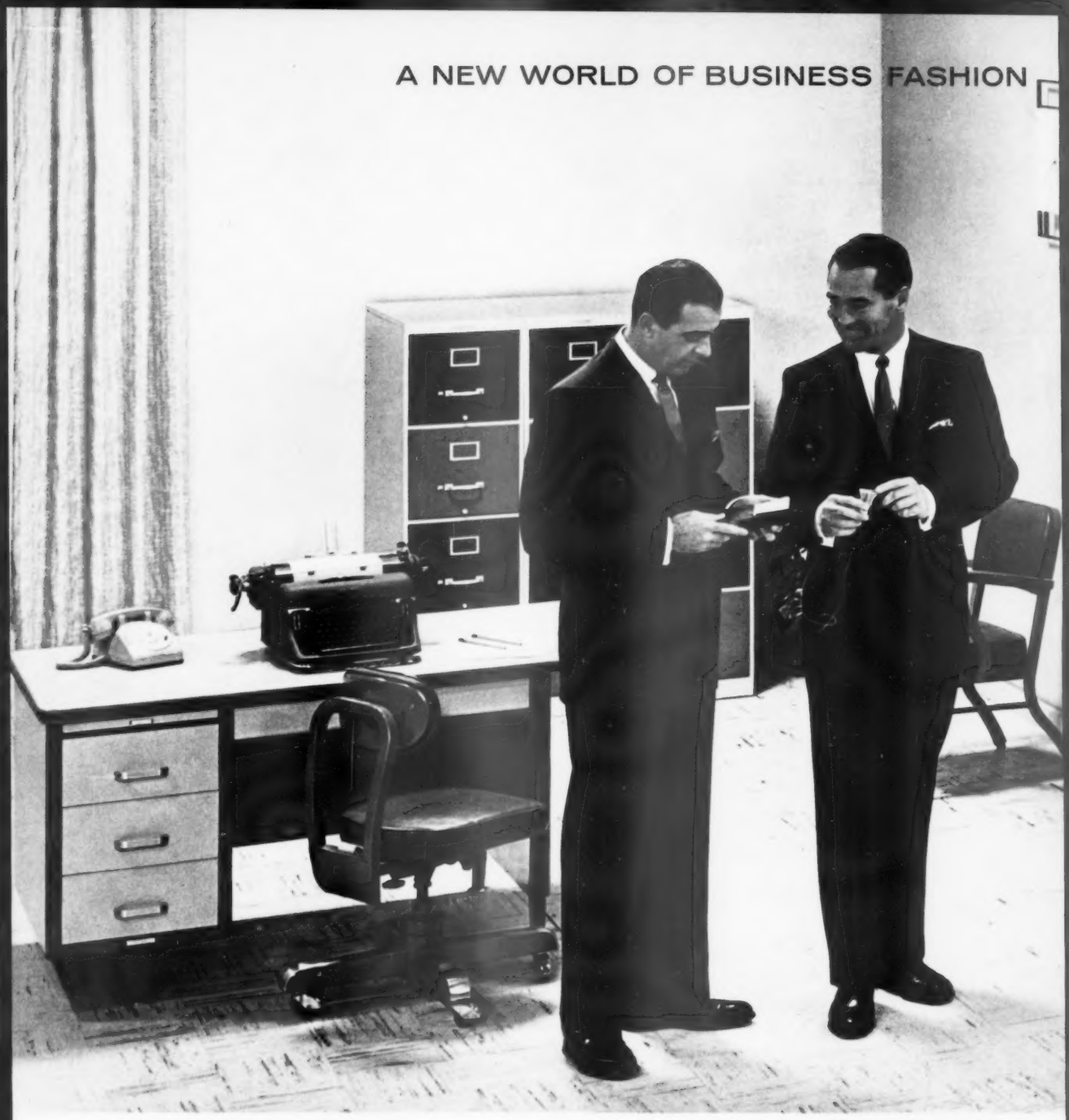
And, thanks to the versatile efficiency of her Olympia Precision Typewriter it'll be done easier, faster, finer. In combination with her Telefunken 600 Portable Dictating Machine, she'll have that correspondence transcribed in no time. She will find Telefunken's handy keyboard control as fast, sure and light-to-the-touch as Olympia's exclusive spring-cushioned keytops!

Coming up, a luncheon date that is real important—But she loves Columbia furniture so much it's a job to get her away.

Why the Eberhard Faber Stenorace typewriter eraser? Just in case of daydreams it's fashionable to have around, and comes in the smartest of colors. And the pencils—he's certain to call in with a real list of "I forgots".

Relax, girl, in your Ballerina posture chair by Columbia.

A NEW WORLD OF BUSINESS FASHION



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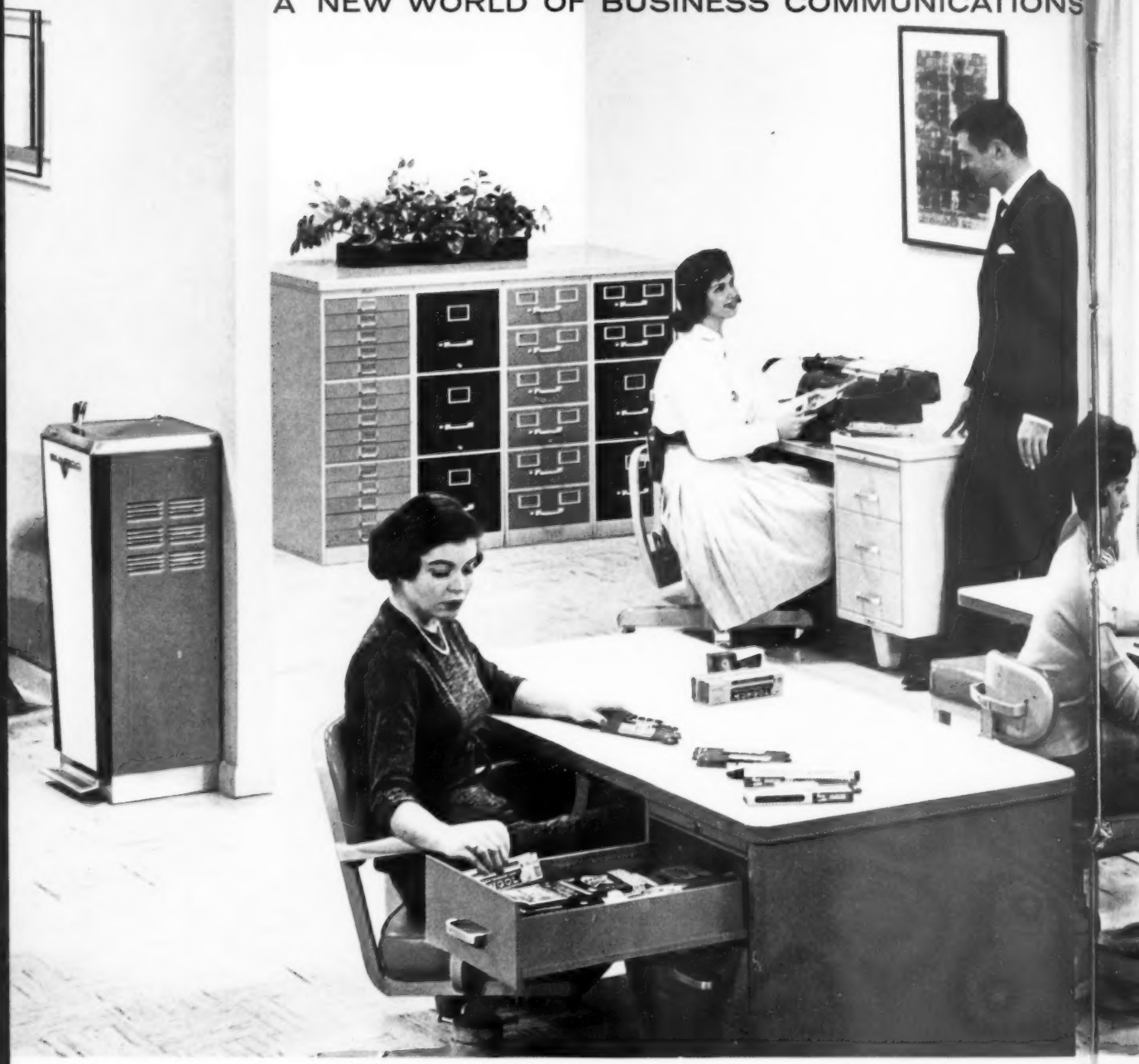
Sales meeting starts in seconds—our newly made V. P.'s carry their titles with assurance . . . thanks to lustrous Coronado suits. Fine worsted mohair fabric, imported from Great Britain, makes Coronado cool and light-in-weight . . . trim-looking, crisp, no matter how extreme the weather—how hectic the day. Impeccably tailored.

Alertness is maintained by the good, cold water from their Sunroc Advanced Cooler—important to everybody! Beautifully styled for flush-to-wall fit—choice of color! Value guaranteed because new Sunroc Coolers are so good they can be guaranteed twice as long as any others.

Reason for this meeting—equipping of sales force with General Electric Voice Directors. The new transistorized pocket communication receivers permit instant contact with representatives away from their offices.

The interior carries out this same impression of good taste and fashion know-how in management's choice of furniture by Columbia.

A NEW WORLD OF BUSINESS COMMUNICATIONS



Functional cooperation with the sales department is the responsibility of the home office. The General Electric Desk Mate two-way radio transmitter, providing constant communication between the company's factories and trucks, will now also operate with the sales organization through the use of their Voice Directors.

For those extra-wide sales forms and inventory lists there's the Olympia Typewriter with an interchangeable 18″ carriage—just one of seven widths available. Not so simple to copy—is the fine fit of his lustrous Coronado suit.

Our attractive but competent supply clerk checks her supply of Eberhard Faber Mongols, Colorbrite pencils and Noblot Erasatip desk ball pens. When the meeting breaks they'll be breathing down her neck for their allocation.

Our "big man on the sales force" wants answers. He gets them quickly from the well designed "fingertip control" Columbia File Cabinets.

GENERAL ELECTRIC COMMUNICATIONS SYSTEM

SUNROC WATER COOLERS

COLORBRITE PENCILS EBERHARD FABER

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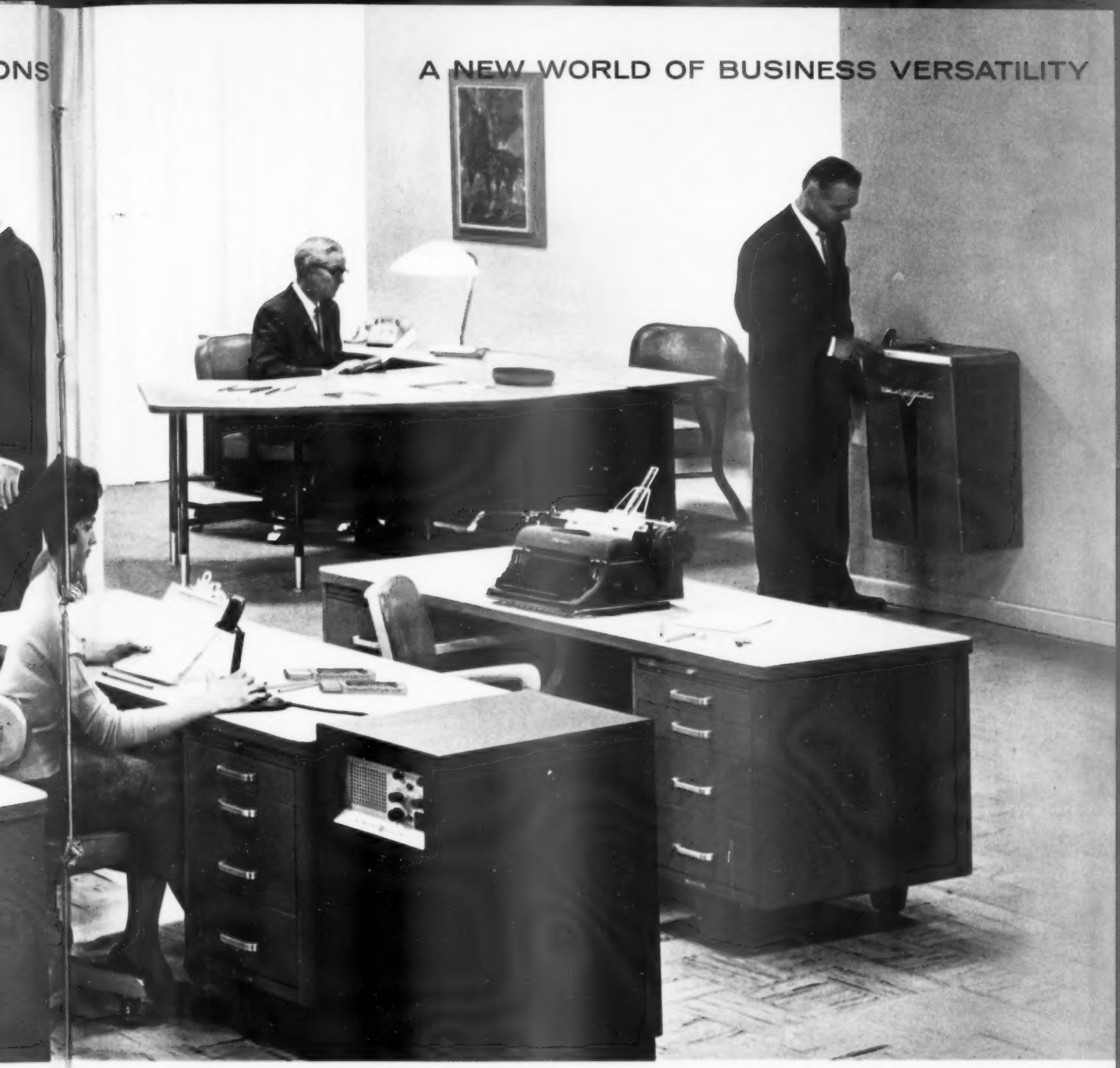

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The division's newest recruit presses the sanitary, front button control for a refreshing drink from the Sunroc* Wall-Hung Cooler—designed to clear the floor. Hard to tell whether he's looking for the missing Olympia operator or just admiring the work center of furniture by Columbia.

Key noting our meeting—the Vice President in Charge of Sales. Decision maker—taskmaster—colorful in temperament—this is a man of action. For men such as this, Columbia presents the Meridian Executive Collection of fine office furniture . . . meeting ground for individuality and utility.

This same character note is to be found in his Coronado Suit—so cool and lustrous—reflecting its rich British heritage.

And now behind closed doors the sales meeting has begun where American ingenuity and planning will express itself in dynamic thinking for the goals to be met.

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VAN DYKE TYPEWRITER ERASERS
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SUNROC WATER COOLERS

Meet the head of this vital growing organization, proud and certain of his company's ability to prosper. He demands that his surroundings reflect foresight, efficiency and convenience.

For his office—mirror of his personality, he has selected the Columbia Meridian line of executive furniture in distinguished good taste . . . color styled, versatile, distinctive.

Uses the ultimate in modern dictating systems, too . . . the compact, self-powered Telefunken 600 Portable Dictating Machine. Likes the all-purpose efficiency of dictation, recording, transcription and portability combined in one handy, lightweight unit. The choice of Eberhard Faber writing equipment—a secretary that's as charming as she is quick . . . all the marks of hard hitting success. His lightweight, lustrous suit by Coronado completes the portrait of success.

Huddle on solid circuits at Texas Instruments involves (from left) JACK S. KILBY, 36, senior engineer of the solid circuits department; ARTHUR EVANS, 40, senior project engineer; RICHARD E. LEE, 31, manager of the solid circuits department, and JAY W. LATHROP, 32, senior project engineer for the Semiconductor-Components Div. The last two hold Ph.D's.

were selected and the bad ones thrown away. Only recently had this chancy method of production changed.

Finding a Better Way

Despite its drawbacks, the point contact transistor proved that a solid state amplifier would work. The next advance required more basic research—this time, into the properties of crystalline semiconductors and, with the help of mathematical theory, into the behavior of electrons in solids.

From the fruits of these studies, Shockley in 1949 was able to predict mathematically that it would be possible to produce a new type of transistor based on a single crystal of semiconductor material. (The point contact devices were made from pieces of material with many crystals.)

Instead of causing current to flow between two delicate wire points, as in the point contacts, Shockley proposed a method of controlling current flow between areas of impurity elements in the crystal itself. These impurities would be introduced into the single crystal in amounts so tiny that ordinary chemical or metallurgical analysis couldn't detect them. Scientists call the boundaries between differing impurity levels "junctions."

Because the "junctions" would be relatively much bigger than the wire points in a point contact, a junction transistor could handle much more power, Shockley speculated.

• **Salt From Sugar**—Before Shockley's theory could be put to practice, more basic research was needed. Metallurgists and chemists had to find ways to make germanium purer than any material had ever been before. Impurities could make up no more than one part in a million or several in a billion. It was, as one scientist said, "like trying to separate a pinch of salt evenly distributed through a trainload of sugar when you didn't even know the impurity was salt."

Not until 1951 could the first junction transistor be made to work. (How it works is shown in simplified form in the diagram on page 78.) But it still seemed doubtful that transistors ever could be built to fit predetermined specifications. Better materials were essential.

• **Another Breakthrough**—In 1954, almost unbelievably, Bell Labs came through with another breakthrough. William G. Pfann, a metallurgist, invented zone refining. This is a high-frequency heating technique that can melt a localized area of a long ingot of germanium—or other metal—and sweep the melted zone through the length of the ingot. The melted material is either a more or less effective solvent for impurities than the solid; so it sweeps the impurities in the metal to one end or the other of the crystal.

This technique was a boon: It not only purified the germanium, but it also concentrated the impurities in one end where more of them could be identified. It also provided a way to spread impurities evenly, under close controls, through the crystal.

With vastly improved materials, the semiconductor industry was off to the races.

The Investors Open Their Recipe File

When the semiconductor industry began its growing, Bell Labs held basic design and process patents covering the entire field. The growth gained terrific impetus from Bell's policy of putting these virtually in the public domain. Almost 90% of the semiconductor items now in commercial production came right out of "Mother Bell's Cookbook."

One factor behind Bell's policy, of course, was the legal storm that has been swirling around electronics patents for years now—and hasn't yet entirely subsided. Over the years, Justice Dept. antitrust attorneys under both Republican and Democratic Administrations have pretty well established it as a principle that, broadly, a company should not be allowed to use a patent monopoly as a weapon to dominate an industry.

In 1949, the antitrusters filed a suit seeking to separate American Telephone & Telegraph from its manufacturing arm, Western Electric—but also dealing with the Bell System's patents. Meanwhile, Western Electric offered to license all comers for its transistor patents on payment of a $25,000 ad-

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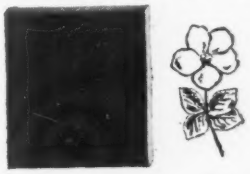

poration, a leading manufacturer of matrixes, asked Riegel to look into it. Result, "Thermomat®" . . . an extremely rigid matrix made of a special Riegel paperboard, coated with plastic, calendered to accurate caliper. No shrinkage, fine register.

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TECHNICAL PAPERS FOR INDUSTRY

Making a transistor is delicate work that sometimes requires absolute cleanliness. Most of the jobs are still done by hand.

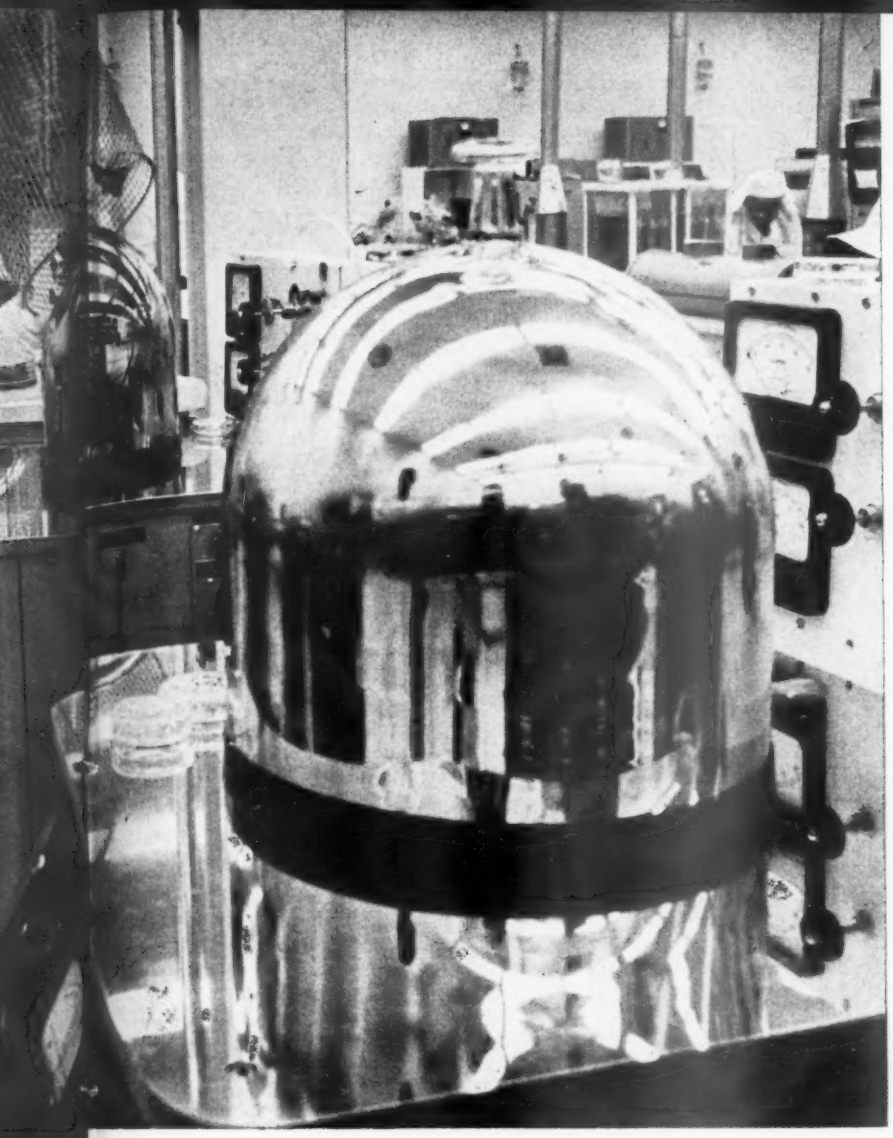
(Semiconductor starts on page 74)

WOMEN WORKERS at RCA Semiconductor Div. plant in Somerville, N. J., assemble transistors in room with controlled atmosphere. Women seem best suited to such jobs.

vance royalty. J. A. Morton, vice-president of Bell Labs, says Bell realized transistors were too big for any one company to handle.

• **Cases Settled**—But outsiders could get at Bell's patents without paying anything in advance by taking advantage of Radio Corp. of America's cross-licensing deal in electronics with Western Electric. RCA, itself under a Justice Dept. investigation that culminated in filing of an antitrust suit in 1954, offered the Bell patents without requiring deposits.

By 1954, several dozen companies were turning out transistors. Some of them had taken out RCA licenses but never paid any royalties at all. They gambled that the legal action would result in freeing the patents. And this was how it turned out. In 1958, RCA signed a consent decree ending the suit and releasing nearly all its existing patents royalty-free; shortly before it did this, it forgave all back royalties. In 1956, two years earlier, AT&T had



TWEEZERS help in preparing tiny metal chips that will be baked onto transistors.

VACUUM BELLS in profusion are typical of production lines for mesa transistors.

signed a decree leaving Western Electric in the family but freeing the Bell patents up to then to one and all.

• **Still on Top**—Bell Labs now has an open licensing policy for all patents awarded since the 1956 decree. Each license is negotiated individually. If the licensee is a manufacturer only, royalties are relatively high. But if it also does research and is a fertile source of new knowhow, such as Texas Instruments, say, royalties are scaled low or even waived in return for cross-licensing.

The result of this policy is that, although Bell's patents are open to the public, the Labs are able to stay pretty well at the top in semiconductor technology. Just about everybody has to come to Bell Labs for the industry's basic recipes, and cross-licensing gives Bell access to the others' findings. There are few technical secrets that can't be discovered, either by licensing or by raiding a competitor's staff.

• **Low-Level Secret**—The availability of

CHANGING SHOES and putting on clean overalls are required before entering production area at Motorola plant. The reason: to keep transistor failure rate to 0.007%.

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AND OTHER PRINCIPAL CITIES

patents wasn't the only factor encouraging an industry free-for-all. The Defense Dept. helped, too, by never putting a high security classification on semiconductor devices. (Some scientists are convinced that the Pentagon never really understood the transistor's implications.)

Finding Better Ways to Produce

At one time in the industry's early years, Zenith Radio Corp. ran big newspaper ads to apologize for its defective hearing aids—and blamed the defects on the transistors it was obtaining from suppliers. The trouble stemmed from water vapor that seeped into the devices and contaminated them.

This problem was remedied by improving the seal on transistors' metal cases, but it was typical of the production woes that afflicted the industry in its toddling stage. Although slightly more than 1-million transistors, valued at $4.8-million, were manufactured in 1954, no one had yet found a really satisfactory way to make them.

• **Points to Watch**—In producing transistors, there are anywhere from 6 to 60 different factors or "parameters" that must be taken into account. These include power handling capacity, operating voltage, amplifying characteristics, maximum operating frequency, failure rate, and many others. They determine what kind of transistor the product will be, and each parameter must meet rigid tests.

Most of the parameters are determined by the characteristics of the transistor's base layer—its most critical area. A transistor can be pictured as a sandwich in which the base layer—often less than a thousandth of an inch thick—is the meat (diagram, page 78). In general, the thinner the base layer, the higher the operating frequency. The larger the base area, the more power the unit can handle. But as the base layer gets larger and thinner, it becomes harder and harder to make.

Good—But Not Good Enough

In 1955, there were two principal techniques for producing this transistor sandwich.

The simplest—and still most common—method is to alloy dots of impurity elements on opposite sides of a thin slice of germanium or silicon. The time and temperature of baking in the alloy process control the depth to which the impurities penetrate—and so control the base thickness.

The other way is to grow a junction in a single crystal. By adding impurities to the melt as the crystal is slowly withdrawn, impurity layers are placed across the diameter of the crystal. The crystal can then be cut into thousands of small bars, each spanning the impurity layers, and each bar can become a transistor merely by the attachment of wires to the ends and to the base.

• **Catch as Catch Can**—Unhappily, neither the alloy nor grown junction technique yields a uniform product. At the end of a run, the transistors must be sorted by complex electronic testing into as many as a dozen or more categories. Until this testing, it's impossible to assess the device's character—or how much it's worth. High-frequency units command the highest prices, and sometimes nearly an entire batch is salable. But not always. And with results so unpredictable, it's difficult to balance production against demand.

The industry has tried almost every conceivable trick to control these variables. Despite some significant progress, there's general agreement that both alloy and grown junction processes are close to their optimums. It took another breakthrough to make the next improvement possible.

The Best So Far

The next stride came in 1955, when Bell Labs came up with the diffusion method. It produced an impurity layer on wafers of single crystal germanium or silicon by heating the material in an atmosphere containing gaseous impurities. This diffused the impurities into the surface. Before it was possible to use this method, though, Bell's scientists had to identify—and control—other impurities that interfered with the material's talents as semiconductors when heated to diffusion temperatures. Those impurities were deadly in such small amounts that no method of analysis could detect them. During the long search, Bell nicknamed the villains Deathnium and Thermium—which, after four years, turned out to be copper in germanium and gold in silicon.

To the researchers' delight, the diffusion method made it possible to control the thickness of the base layer to within less than a millionth of an inch simply by adjusting the time and temperature of heating.

With this technique, the base layer

SEMICONDUCTORS

W. G. PFANN, 43, started at Bell Labs as a messenger at 17. He won a chemical engineering degree through night study at Cooper Union. His major contribution to the semiconductor art — zone refining — made mass production possible.

Clean getaway. A flash of flame and the jet is whistling down the runway. Fifteen-hundred-degree heat blasting through the engine creates one of the toughest problems of jet maintenance: heat scale and carbon deposits on engine parts. Today both military and commercial jet maintenance crews lick the problem fast and effectively with a new cleaner-descaler, developed by Pennsalt on the basis of long experience as a producer of aircraft maintenance chemicals.

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SEMICONDUCTORS

WILLIAM B. SHOCKLEY, 50, another of the Nobel Prize-winning trio of transistor inventors, also devised the theory that led to the junction transistor. He left Bell Labs to form Shockley Transistor, a subsidiary of Beckman Instruments.

could cover a wide area and still be produced close to specifications. Thickness could be controlled more than ten times better than with the alloy or grown junction methods.

• **Spreading Fast**—The most promising new type of diffused base transistor got its name from its appearance; it resembles the geological formation known as a mesa. An etching process during production leaves little mounds that look, under a microscope, something like the flattened hills of the Western deserts. The name caught on.

The first diffused base transistor was manufactured by Western Electric. The first to be generally marketed was a high-frequency germanium device introduced by Texas Instruments in the spring of 1958.

The first silicon transistor of the new sort came from Fairchild Semiconductor Corp., now a wholly owned subsidiary of Fairchild Camera & Instrument Corp., which, largely on this one product, built sales from less than $500,000 in 1958 to about $7-million in 1959.

• **A Mesa's Beauty**—The mesa transistor has yet to hit the industry with full impact. But it soon will. Almost every transistor maker is rushing to produce the devices. More than 20 companies will include facilities to turn them out in new plants under construction or in advanced planning.

The mesa type has many beauties. First, of course, there's the way the thickness of the critical base layer can be tailored. Manufacturers can vary its characteristics according to special needs, even on relatively short production runs—"just by changing the bake in this little oven, it comes out right on the nose," as a Motorola engineer describes his company's mesa line. The mesa works in the very high-frequency range—in hundreds of megacycles per second, far above the 10 mc. at which the best mass-produced alloy units function. It's rugged, and it's good at dissipating heat. Finally, it's cheaper to produce.

• **Bounteous Yields**—Despite the mesa's promise, a low-cost, high-yield production line already in operation for alloy or grown junction transistors will probably return profits for many years. But the mesa is likely to take over in most new products. "It's the first process," says J. A. Morton, vice-president of Bell Labs, "that has ever lasted four years without a better technique turning up."

Morton's confidence is easy to understand from some of the mesa's yield records—the percentage of units starting out in production that end up salable. Some companies are turning out high-performance mesa transistors to rigid specifications with yields of more than 60%, and many predict yields well over 90% when the bugs are out of production lines. Such a showing in high-frequency transistors would have been utterly impossible with previous production methods.

Higher Yields, Lower Prices

Production yields have always been one of the semiconductor industry's most jealously guarded secrets. Yields are the most influential of all factors affecting prices. They are also inseparable from the question of whether or not production should be mechanized—a lively issue in the industry today.

Turning out a transistor with most present techniques takes much delicate handwork of a sort to which women seem best adapted. Currently, more than 80% of the industry's 40,000 employees are women.

When technology changes as fast as it does in semiconductors, it's much cheaper to retrain workers than to rebuild expensive automatic machinery. This is a potent argument against extensive mechanizing. But human hands can't always be counted on to keep products uniform enough. Most companies think that mechanization, with its improved control over variables, is the best route to high yields. So many transistor makers have plunged into automation, praying all the while that the equipment can be written off before the product becomes obsolete.

• **Wide Range**—With alloy transistors, yields now range from about 50% to a little more than 90%. A typical batch might test out this way: 20% high-frequency, high-performance units selling at $6 or more each; 20% medium high-frequency units bringing $1.50 to $2.50 apiece; 40% entertainment-quality transistors salable for 45¢ to $1.50—and 20% expensive junk.

The entertainment-quality devices, for radios, TV sets, hearing aids, and such, score the highest yields. Their

SEMICONDUCTORS

JOHN BARDEEN, 51, also one of the three who developed the first transistor at Bell Labs and won the Nobel Prize, is teaching physics at University of Illinois.

IN THE SOUTH...

SUPPLY AND DEMAND GROW HAND

FOOD PROCESSING, one of the South's flourishing industries, has an outstanding example in the Tom Huston Peanut Company, Columbus, Georgia. In an 18-year period, annual sales of this company and its affiliated companies have increased from $4 million to a current $45 million. Plant employees now number over 1,000.

The last half of the twentieth century belongs to the South!

ONE OUT OF EVERY FIVE grocery-type bags used in America is manufactured at Gulf States Paper Corporation, Tuscaloosa, Alabama. To increase capacity and modernize facilities here and at its mill in Demopolis, Gulf States is engaged in a $20 million program.

ELECTRONIC DEVICES for the United States' satellite and guided missile programs are designed, developed, and built at Fort Walton Beach, Florida, by the Canoga Division of Underwood Corporation. The Canoga plant site is adjacent to Eglin Air Force Base.

FEMININE FINERY is manufactured for distribution all over the United States and in 20 foreign countries at the Purvis, Mississippi, plant of Movie Star, Inc., makers of lingerie and sleepwear. The company has four plants in Mississippi, with approximately 1,300 employees.

...N HAND !

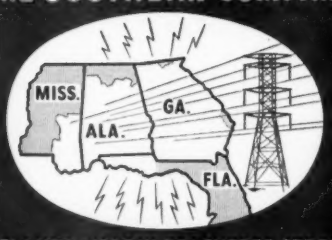
With its ever-widening, diversified industrial output, the South enters the 1960's with greater-than-ever strength and stability! Accelerating the region's amazing development is the South's demand for its own products. Supply and demand are moving forward together.

Since World War II, the region has welcomed almost 5 million new residents. Manufacturing payrolls have increased by $3.5 billion. Retail trade has jumped $8.8 billion!

In the same period, electric power production in the South has outdistanced the gain of the nation as a whole—by 48%!

A significant part of this power development has occurred in the four-state area served by The Southern Company and its investor-owned power companies. To provide increased electric service in the promising years ahead, The Southern Company group will continue its program of systematic expansion, with plans calling for an investment of over one-half billion dollars in the next three years alone.

THE SOUTHERN COMPANY



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SEMICONDUCTORS

H. BRAINARD FANCHER, 45, is general manager of General Electric's Semiconductor Products Dept.—the largest semiconductor operation in the industry except for the biggest independents.

tolerances are broad, and they have been longest in production. Since volume runs high, manufacturing of these units has been almost completely automated by some companies.

Texas Instruments has recently installed a desk-size, merry-go-round machine that picks up alloyed chips of semiconductor material, welds on the tiny leads, attaches the leads to wires, etches and washes the assembly, and passes it on to a bake oven. Then it is automatically capped and graded. Running unattended most of the time, the line does well indeed on yields, with much of the output in the 50¢ class for the entertainment market.

• **Loyal to Hands**—By contrast, another manufacturer crows about 90%-plus yields from large-volume hand production of a germanium alloy transistor of very broad tolerance. "We're making a fabulous profit," exults the product manager, "and I wouldn't touch the line now. . . . There is only 6¢ worth of labor in the device; so suppose I could take out 4¢ by automating—and I'm not at all sure that's possible. Would it be worth a $10,000 gamble on equipment? If my yield slipped even 2%, I couldn't possibly pay for the machinery."

But Philco, for one, has almost completely mechanized its production of high-speed microalloyed switching transistors for computers, with lines turning out several hundred units an hour and only eight employees per line.

Some of Philco's competitors contend that this production rate is too slow to justify the several hundred thousand dollars invested in each line. It's more general for semiconductor makers to mechanize gradually, with emphasis on operations that seem least likely to change, such as encapsulation and testing. Texas Instruments has even put two of its own testing machines on the open market—though without spectacular sales results so far.

• **Down, Down, Down**—As mechanization and other methods improve yields, perhaps even to the average of 90% that some observers consider possible, prices will plummet.

Dramatic price cuts have been part of the industry's way of life almost since birth. It doesn't look that way from the average price paid for a transistor, which increased from $2.41 in 1958 to about $2.50 in 1959. But that was a statistical oddity: Luckily for the industry, the explosive growth in sales of relatively expensive units offset plunges in prices of other lines.

An example of those plunges comes from a computer maker. Eighteen months ago, it paid $3.50 for a switching transistor to go into its high-speed printer. About a year ago, the price dropped to $2.50 and then continued a steady decline. It's now $1.70. For a high-speed switching transistor with much tighter specifications, the same manufacturer started out paying $40. The bill is now $12.50, and the company expects it to fall to $5 before long.

• **Philco's Tag**—Even more spectacular is the price history of a Philco high-performance switching transistor. Introduced in sample lots at $100 each in 1956, it came on the market in May, 1957, at $60. By September of the same year, it was down to $19, and this February it could be had in lots of 1,000 for $6.75 apiece. There are two reasons for the skid, both common throughout the industry: competition and increased yields.

These factors will continue to push prices down. A hint of the future pattern of prices comes from a prediction of manufacturing costs by A. E. Anderson, manager of Western Electric's largest transistor plant. Anderson forecasts that diffused base transistors of the mesa type will cost about half as much to produce as alloy transistors, now the most common and least costly type.

Anderson based his estimates on full mechanization of production. But he didn't take into account possible breakthroughs that might eliminate the metal case in which transistors are sealed. This case often costs as much to make as the transistor itself.

There are two ways to do away with the case, both developed at Bell Labs. One method protects the transistor by building up a silicon oxide coating, the other by using a low-melting-point glass.

Using the oxide process to eliminate the case, Pacific Semiconductors is already selling diodes, and it has distributed experimental mesa transistors the size of a pinhead. Motorola is testing many devices with a glass surface. Many other companies are hard at work on both techniques. If the transistor case

SEMICONDUCTORS

I. ARNOLD LESK, 33, c Ph.D. from Illinois, is consulting engineer at GE's advanced semiconductor lab. He is credited with the unijunction transistor, transistor tetrode, and recent tunnel diode developments.

Rockwell Report

by W. F. ROCKWELL, JR.
President
Rockwell Manufacturing Company

FROM THE FAR EAST—Is it practical to manufacture your products in the Far East, if differences in labor costs make it impossible to sell your U.S.-made products here? Does the potential justify the investment?

Those are questions more and more manufacturers must face. We are trying to get the answers through an intensive market research program, combined with a first-hand look at the Far Eastern economy.

The speed of jet travel sharpens the contrast between the industrialized West and the largely agrarian East, but the basic needs are much the same, differing mainly in degree.

Even a brief visit indicates, for instance, the great need for schools. But here the first need, in most countries, seems to be for education in simple mechanics to develop the skills to run, and maintain, the machines with which a higher standard of living must be built. It is encouraging to see our Delta Industrial Tools prominent in this work in such schools as exist.

Shortage of electric power in the Far East limits the application of these tools, so they are not so commonly used in industrial and construction work as they are in the United States. But with the development of electric power, another basic need (and a market for our Edward valves and Republic Flow meters), these tools will stimulate the mechanization which is almost sure to come to these areas.

Because good water is so convenient to most of us, we tend to forget that it is vital not only to our home lives, but to the very existence of modern industry and commerce. Potable water is in short supply in many areas in the Far East. This forecasts not only the development of water and sewage systems (in which our Rockwell-Nordstrom valves are used) but also the use of water meters to prevent waste.

Modern roads are another basic need, and their further development here is inevitable. Already, in the larger centers, roads and the automobile have created markets for a number of products similar to those we make in the United States: taximeters, parking meters, and fare registers. These markets didn't exist in this part of the world to any extent fifteen years ago.

Schools, water, power, roads—these are the basic needs so fundamental to the development of a modern society anywhere in the world. The three types of products we make (measuring devices, control devices, and power tools) are also basic to modern civilization. It seems inevitable that the needs in the Far East will constitute a sufficiently large potential to justify a long term expenditure.

* * *

A special employee news service has been installed as a part of the closed circuit phone system in our headquarters office. Each morning 60 seconds of company news is recorded. Merely by dialing a special number, any employee can keep up-to-date on the latest promotions, employee and company awards, financial information, vacation schedules, cafeteria menus, and other items of general employee interest.

* * *

A new Delta Radial Drill, with greater "reach" and flexibility than drill presses costing many times as much, has been introduced by our Power Tool Division. The new radial drill (head swivels 360°; tilts 90° right and left) will drill with precision to the center of or at any point on a 32-inch square, and at any angle. It was designed particularly for pattern, woodworking and furniture shops, light industry, and home workshops.

This is one of a series of informal reports on the operations and growth of the
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for its customers, suppliers, employees, stockholders and other friends

SEMICONDUCTORS

LEO ESAKI, 34, a Ph.D. from Tokyo University, developed the diode that bears his name — also known as the tunnel diode. It's the talk of the semiconductor industry today. He is with Japan's Sony Corp.

and its high added cost can be entirely eliminated, prices can be pushed down even further.

Companies Scurry For Top Positions

It's nothing new for a new product to bring a high price at first and a low one later. The first ball-point pens, for instance, cost the customer $15; now you can buy a ball-point—and a better one, at that—for a quarter. In just the same way, junction transistors dropped from $100 to about 50¢.

By taking the profits from the early high prices and repeatedly plowing them back into research and expansion, the semiconductor industry has been able to bring out a flood of new products—each commanding a handsome price to begin with. In effect, it has worked the ball-point pen cycle over and over again. Only one of the industry's products has so far become obsolete—the point contact transistor. Even these are still turned out at the rate of about 40,000 a year by Western Electric for use in automatic long-distance dial systems.

The drug industry has profited for years from a similar new product and price pattern.

• **Tomorrow's Worries**—It is by no means certain that the semiconductor industry can continue the pattern indefinitely, however. It is nagged by some vexing questions:

• How fast and how far can it reduce prices without endangering its ability to maintain a flow of profitable new products?

• When will it start behaving like a normal industry and standardize products?

• If it does standardize, will price competition become so frightful that no one can make a decent profit?

As the industry matures, it must grapple with questions such as these,

SEMICONDUCTORS

RICHARD G. SEED, 36, is president and founder of year-old Semicon, Inc., a specialist in medium-power silicon rectifiers, which recently graduated from a basement to a new plant. He is a physics Ph.D. from Harvard.

How to keep a green green

The rich, dark-green color of good golf turf is a lot easier to maintain where V-C 13 is used. This powerful chemical, an organic phosphorus compound, gives positive control of turf insects and nematodes, two of the major reasons for faded, yellowing grass . . . dead spots.

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SEMICONDUCTORS

DONALD W. GUNTHER, 41, a metallurgist, manages the Westinghouse semiconductor department. Before that, he headed the materials engineering department for the same company. He graduated from Colorado School of Mines.

and millions of dollars ride on finding the right answers. So far, the answer has generally been research and more research to keep technologically ahead. Practically every manufacturer claims it's at the top in percentage of the sales dollar reinvested in research and plant.

Two Flourishing Independents

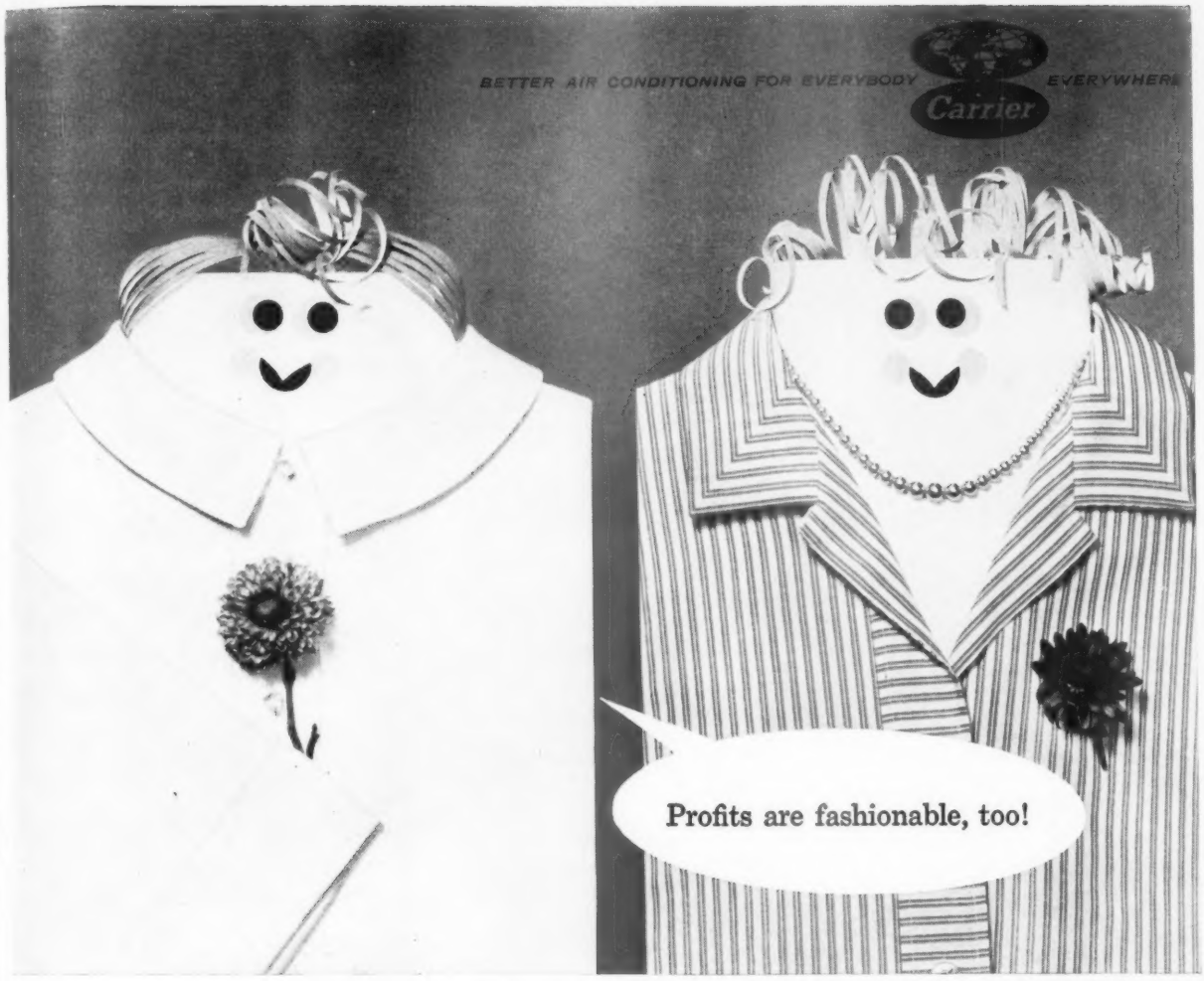
In most cases, though, it's difficult to tell just how much a semiconductor maker takes in and plows back; most of them are divisions of larger corporations, and the figures are buried inside the company's over-all statistics. But a fairly clear picture of the industry's inner workings emerges from a look at the independents that do all or most of their business in semiconductors—such as Texas Instruments and Transitron.

Texas Instruments (BW—Dec.22'56, p56) leads the industry in sales, and in technology it's considered second only to Bell. In 1959, it scored net sales of $193-million, about half attributable to its broad product line of semiconductors which includes silicon and germanium transistors of all types, silicon diodes and rectifiers, and silicon controlled rectifiers. This compares with 1947 sales of less than $5-million, almost all of it from performing geophysical services—the business in which the company started.

From 1953 to 1959, stockholders' equity in TI has multiplied better than eight times—to $56.7-million—and the stock has been a speculators' favorite, although it has never paid a dividend. It whooshed from about $5 a share in 1952 to a 1959 high of $191. After-tax earnings last year were more than 7% of sales.

• **Series of Firsts**—Most of this growing has been done on self-generated capital, thanks to the Semiconductor-Components Div., undoubtedly TI's most profitable operation. The company has won its eminence by astute assessment of new products and canny timing. Its broad technological skills have made it first with many semiconductor devices.

TI's prowess began to show up in 1954. The company was first to turn out silicon transistors that would operate at temperatures above 100C—and the competition didn't catch up for a year and a half. TI was also first to demonstrate how to build a semicon-



SHIP 'N SHORE EARNS 33% RETURN ON CARRIER AIR CONDITIONING INVESTMENT

Every manufacturer knows that the successful solution of one problem carries within it the seed of another.

In the case of Ship 'n Shore, makers of the famous line of girls' and women's blouses, style and fit created nation-wide acceptance. But the demand that followed caused production headaches in their Upland, Pa., plant. One of them: how to turn out enough blouses for the back-to-school market during the hottest months of summer —when efficiency of workers was at its lowest ebb.

Consulting engineers advised management to install air conditioning, based on the fact that a mere 1.5% increase in work production will cover owning and operating costs. During the five years since the system was installed, actual results have far exceeded this theoretical break-even figure.

The increase in work output of Ship 'n Shore employees during summer months has been so great that annual production has been boosted an actual 10%. Even more gratifying, the annual profit return on the air conditioning investment has amounted to 33% —enough to pay back the cost of the system in three years!

Other benefits have accrued to the company, too. Employee turnover has been so sharply reduced that a $15,000-per-year worker training program was no longer required. Morale is improved, quality is more uniform and absenteeism has dropped.

Many other manufacturers report that Carrier year-round air conditioning is producing similar gains in productivity. Significantly, these gains are not affected by the geographical location of plants or the type of products being manufactured in them. On the other hand, the worker density in a given plant or plant area is almost always a key factor. Where the number of square feet per worker is low, the return on an air conditioning investment is invariably high.

There are other yardsticks, too—all of them described in the new Carrier booklet. "Will factory air conditioning pay off for me?" which we will be glad to send you without obligation.

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ductor market. By cutting prices drastically on a line of germanium transistors and providing circuit design and a lot of persuasion, TI promoted the little Regency portable transistor radio, made by Industrial Development Engineering Associates, Inc., of Indianapolis. The set caught on, and TI was first to profit from transistors in the mass market—though, according to industry gossip, it sank about $2-million into the project first. Latecomers in the transistor radio market had to be satisfied with a slower return.

• **Brains at Work**—To score these firsts, TI, typical of the industry, has spent lavishly for research and development—$30-million in 1959, half from its own funds and the other half contributed by the federal government for specific projects. All in all, 1,400 of the Semiconductor-Components Div.'s 6,000 employees devote full time to research, product development, engineering support, and patents.

TI's central research staff—including 160 degree-holding engineers, mathematicians, chemists, metallurgists, and physicists—leans heavily toward work in semiconductor materials. Gordon Teal, a Bell Labs alumnus who is research director, describes the staff's activity as "basic, but not pure" research—meaning that he limits projects "to areas of some relevance to the future of TI."

The company also has a unique production engineering group numbering nearly 500, which builds almost all TI's production equipment. "When you have to make something that nobody else ever made," says Frederick Stote, mechanization manager, "you can't very well go out and buy equipment to do it."

• **Hedges**—Obviously, only an exceptional combination of growth and profitable products can support such a concentration of employees on R&D. So far, TI has had the right combination, and there's no sign yet that it might settle down to nothing but standardized products. But the company is trying to protect itself from any future thinning of profit margins by integrating vertically and horizontally. The vertical movement is into raw materials on one hand, instruments and other electronic devices using semiconductor products on the other. It has a deal with International Business Machines to share in comprehensive re-

SEMICONDUCTORS

GORDON E. MOORE, 31, director of research and development at Fairchild Semiconductor, won a Cal Tech Ph.D., worked also for Johns Hopkins Applied Physics Lab and as consultant to Paramount Pictures and Shockley Labs.

Flex your muscles, please

Problem: to increase the vehicle capacity of one of the nation's most heavily-travelled bridges. As a prelude to such a plan, strains of the bridge's present load are being carefully analyzed with PhotoStress. This revolutionary Budd technique involves the bonding of special plastic to a part or structure under study and examining it under polarized light. In color photos, invisible live strains and stresses are transformed into sharply defined, easily interpreted patterns. The process measures strain in anything from a bolt to a skyscraper. PhotoStress is but one small aspect of Budd's vast diversification in the study, testing and fabrication of metals.

You will find details of these activities reported in color photographs in our newly-issued Annual Report for 1959. For your copy, write The Budd Company, Philadelphia 32, Pa.

Mainstreams of Budd's diversified interests: Railway, Automotive, Nucleonics, SpaceAtomics, Electronics, Airframes, Missiles, Metals Testing and Plastics.

THE BUDD COMPANY

OFFICES AND PLANTS IN PRINCIPAL CITIES

SEMICONDUCTORS

ROBERT N. NOYCE, 32, vice-president and general manager of Fairchild Semiconductor, took a physics Ph.D. from MIT. After stints at Philco and as director of research at Shockley, he helped form Fairchild.

search on computer components; in return, IBM will buy a substantial percentage of TI transistors for its data processing equipment—a market that is nowhere near satiation.

TI is also diversifying horizontally into other electronic components, such as silicon resistors and tantalum capacitors. And it is ardently committed to solid state circuits; it is the only company so far to offer solid circuit function devices in commercial quantities.

• **Start From Scratch**—Of the many other independents in the industry, only Transitron Electronic Corp. of Wakefield, Mass. (BW—Dec.5'59,p123), has burgeoned into a significant force.

Transitron was founded in 1952 by the brothers Leo and David Bakalar. David Bakalar, a young Harvard-trained physicist, wanted to get into basic semiconductor materials, and Leo lent $1-million to start the business. They first manufactured gold-bonded germanium diodes and the devices won immediate respect for reliability and low cost. In 1953, when the diode passed Joint Army-Navy specifications, the lush military market opened up.

By 1954, the new company was in the black, and the ink has been thicker and blacker ever since. In the fiscal year ended last June, Transitron's sales were $30.9-million, net income after taxes nearly $6.5-million. In sales, it's second only to TI among independents and in a neck-and-neck race with General Electric for the No. 2 spot in the industry over-all.

Trying to Catch Up

The traditional leaders in the electronics industry are scrambling like mad to overtake the successful independents in semiconductors. Some, such as Westinghouse, which has concentrated on high-power devices, have tended to play a waiting game until either the market stabilizes or their scientists come up with something unique. Others have gone into the business headlong. Meantime, other established companies have diversified into semiconductors; an example is Hughes Aircraft Co., whose Semiconductor Div. quickly took the lead in diode manufacturing and sales. Makers of electronic products joined the fun, too, as a step toward vertical integration.

The front ranks today include GE, RCA, Westinghouse, Hughes, Philco, Sylvania, and Raytheon. But Texas Instruments is still far ahead in sales volume of semiconductor products.

• **A Partial Who's Who**—A sampling of some of the highlights of activity by a few of the other companies in the semiconductor industry might include these:

Bendix Radio Div. of Bendix Aviation Corp. is making its own power transistors for auto radios and military electronic systems and building a plant to turn out a broad range of silicon transistors.

Motorola, moving faster than Bendix, is producing power transistors, diodes, voltage regulators, rectifiers for auto ignitions, and top-quality diffused junction transistors for a military computer system. Like TI, Westinghouse, and others, it's busy with solid state circuits.

Delco-Remy Div. of General Motors claims (as does Motorola) to be the largest producer of transistors—most of which go into its auto radios. Likely future projects: rectifiers for auto ignitions and, eventually, transistors for solid-state auto ignitions, rumored to be due in some 1961 models.

Minneapolis-Honeywell, which has also produced power transistors on a small scale, is setting up a new R&D lab in Florida.

Allis-Chalmers Mfg. Co., generally sticking close to the power field, is turning out silicon rectifiers and controlled rectifiers.

CBS Electronics Div., in the past a relatively minor factor in the industry, is stepping up its pace under a new management and technical group.

Clevite Corp. has done surprisingly well on a narrow product line—mostly diodes. With highly automatic assembly and testing equipment, it manufactured more than $10-million worth of products last year.

Hoffman Electronics Corp. has had success with solar cells and silicon diodes and recently introduced a line of mesa transistors.

International Rectifier Corp., long a maker of selenium rectifiers, has completed a smooth transition to silicon. It's introducing a new line of controlled rectifiers.

Sperry-Rand Corp. has built large new quarters to produce transistors and diodes.

Too Few Brains to Go Around

Since the semiconductor industry has been built on brains, by far the toughest problem faced by all of the companies has been finding enough brains to go around. There's no such animal as a semiconductor engineer, as such—companies have to make their own from chemists, physicists, electronic engineers, and other specialists. Even then, once a man has established his expertise, there's no guarantee that he won't succumb to juicy offers from competitors.

Scientists with a name in the field get several calls a month at home from recruiters. As salaries climb higher and higher, so do a company's fixed costs. "You can't get anyone today," moans one division manager, "unless you can offer him a stock option."

A canny job jumper can sometimes double and redouble his salary before employers discover he really wasn't worth the original amount. But, fortunately, most of the industry's brains are more serious about their calling.

• **Brainy Bosses**—Another personnel problem is the likelihood that a top-notch semiconductor man will be hoisted out of the lab and into a top executive's armchair. In such a technical industry, the top brass practically has to run heavily to scientists—and this, too, dilutes the research ranks.

Some of the men at the top are among today's most glamorous business successes. Starting with outstanding scientific skills and practically no capital, they are now worth millions.

A good many of the industry's experts cut their teeth at Bell Labs—which, besides supplying semiconductor makers with a cookbook, has provided a lot of the chefs.

• **Migrations**—Whatever the company, though, it is likely at some time to have lost key people—occasionally in batches. Some random examples:

• Men from Hughes Semiconductor Div. formed Pacific Semiconductors, Inc., a division of Thompson Ramo Wooldridge.

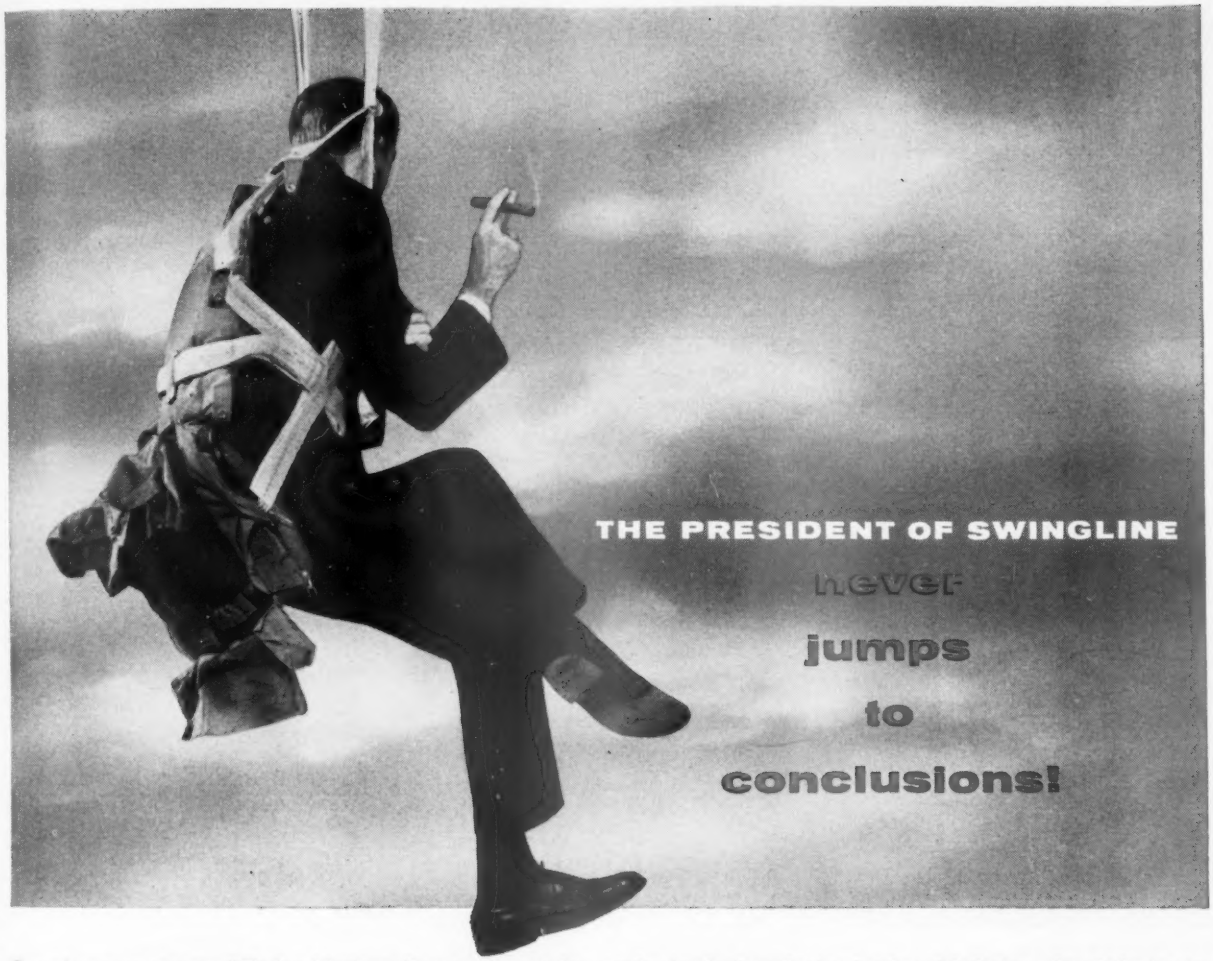
• An exodus from Radio Receptor Corp. led to creation of General Transistor Corp., an independent now with annual sales of around $11-million. Alumni of General, in turn, split off into Industro Transistor Corp. and Silicon Transistor Corp.

• Transitron lost a group that established Solid State Products, Inc.—which then beat Transitron to market with a silicon controlled rectifier, a device pioneered by General Electric.

• **Bay Area Story**—One of the most vivid examples involves the three major

SEMICONDUCTORS

JAY LAST, 31, an MIT Ph.D., is one of the eight founders of Fairchild Semiconductor Corp., where he heads device development. He has also worked for Eastman Kodak and Shockley. His current project: micrologic computer components.



Smart man—our man! He has his "team" research...study...probe deeply into the intricacies of industry after industry to uncover their needs and specific production problems. Why? So they can find out how SWINGLINE can do the job quicker, easier, more effectively. (And SWINGLINE most always *can*!) No trivia-catcher, the President of SWINGLINE...he never jumps to conclusions!

A good example of SWINGLINE'S thoroughness? The parachute industry! Completed parachutes are carefully folded, then placed inside a nylon "pack" which must be sewn all around for proper closing. The Pioneer Parachute Co., Inc.* knew this nylon fabric to be unusually sturdy. It had to be held together in some way *until* the permanent stitching could be completed. Basting with needle-and-thread proved time-consuming, expensive, difficult to remove. Pinning was not reliable. The President and his "team", faced with this problem, thoroughly investigated every angle, worked in conjunction *with* Pioneer, and uncovered the solution: SWINGLINE's handsome, effective, economical master desk stapler–the No. 4!

Imagine!–a *desk* stapler in the parachute industry! Yet, used with the aid of an attached foot pedal (a bit of SWINGLINE ingenuity!) the No. 4 effortlessly held the "pack" together until it was carried to the sewing machine for final stitching. Afterwards, the staples could easily be removed–with SWINGLINE's easy-action staple remover, of course!

About the No. 4? It holds 210 staples, loads in a breeze thanks to SWINGLINE's exclusive *open channel*. It's a hard-worker –but just *one* of many efficient SWINGLINE models geared to industry's specific needs. The No. 3 is a shorter desk model... the No. 27 a rugged model that can be imprinted with a company name, too. For versatility, the No. 77s does an all-inclusive job: staples, tacks, pins, fastens, and *stores* 500 staples! SWINGLINE also has that marvel of marvels, the *completely automatic* electric stapler that requires only a feather touch to turn out tons of fastening work. No matter what your production need, SWINGLINE has the industrial stapling tool that speeds production, lower costs. (Witness SWINGLINE's amazingly efficient, compact, *pre-filled* magazine: a *continuous* belt of 5,000 pre-cut staple-forming wires that ends loss of time due to constant re-loading!)

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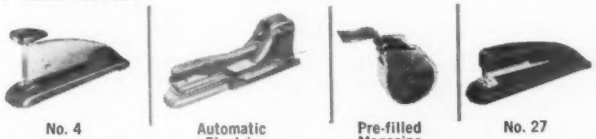

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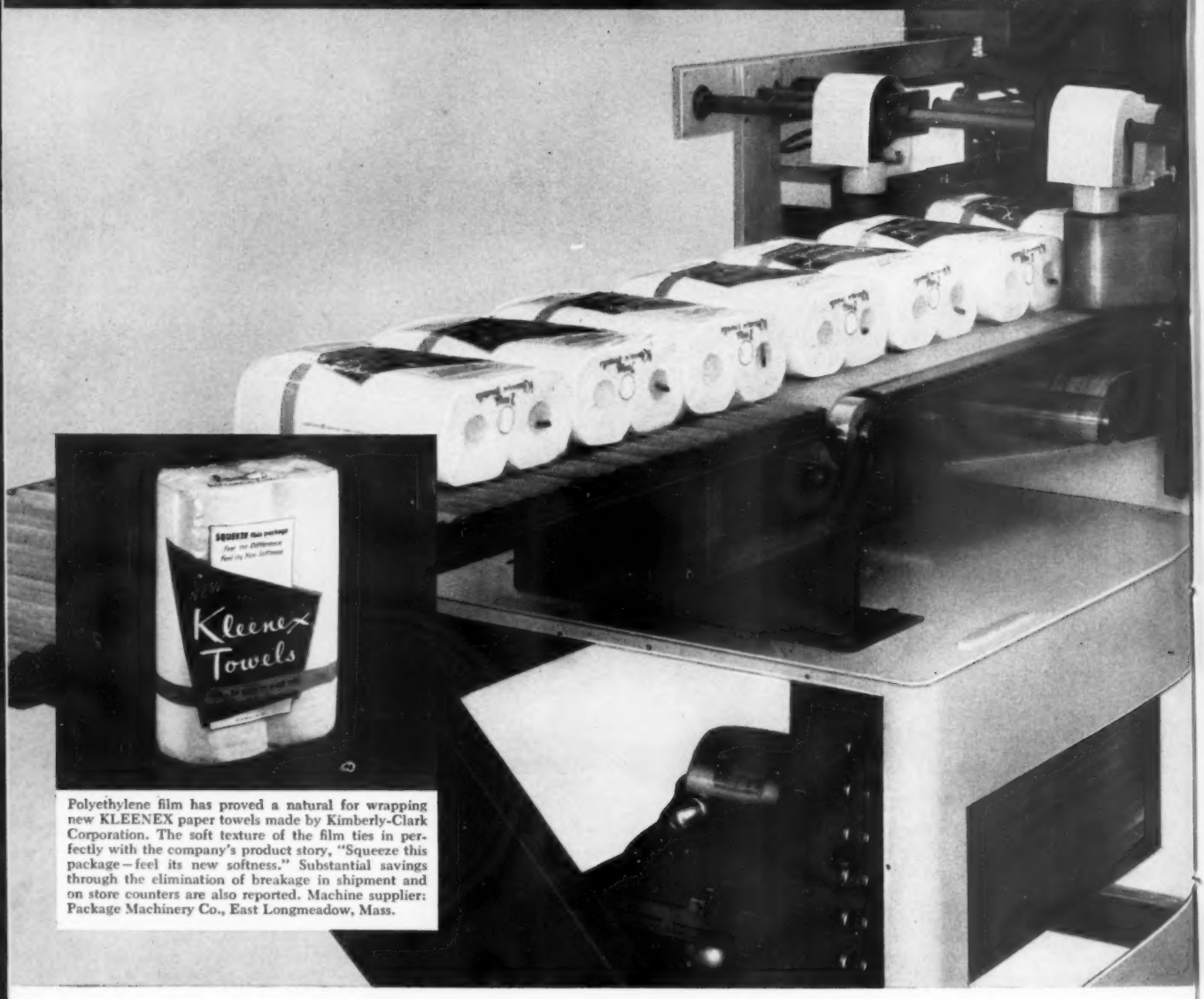

Polyethylene film has proved a natural for wrapping new KLEENEX paper towels made by Kimberly-Clark Corporation. The soft texture of the film ties in perfectly with the company's product story, "Squeeze this package—feel its new softness." Substantial savings through the elimination of breakage in shipment and on store counters are also reported. Machine supplier: Package Machinery Co., East Longmeadow, Mass.

Let commercially proved automatic wrapping machinery put polyethylene's economy into your packaging

Thousands of manufacturers have realized important savings by packaging with polyethylene film. Total use in 1959 was over 250 million pounds—up 650% since '53. Fresh produce, textiles, dry-cleaning, paper products, hardware, frozen food are only a few of the industries currently profiting from polyethylene film packaging.

Now even greater savings are being achieved by *overwrapping* with polyethylene on production-proved automatic machinery. One example is the "Package" U-7 shown above. Package Machinery also has several other polyethylene wrapping machines in commercial use, including the "National" BW-7, a high-speed automatic bread-wrapper.

Here's what polyethylene film offers you: *Unmatched economy*—lowest cost transparent film; *high sales appeal*—soft feel, clarity, sparkle, printability; *excellent storage life*—won't dry out, split or crack; *unique moisture-gas transmission; superior low temperature toughness; inertness to most chemicals.*

Ask *any* of the leading makers of high-speed automatic polyethylene overwrap machines how much his machine will return on an investment geared to your needs. And get our two new booklets of facts and figures on automatic polyethylene packaging. Use coupon at right. Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y. *In Canada:* Union Carbide Canada Ltd., Toronto 7.

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MARK SHEPHERD, Jr., 37, vice-president of Semiconductor-Components Div. at Texas Instruments, was a test engineer with GE before World War II, later an electrical engineer with Farnsworth. He joined TI's predecessor in 1948.

members of the industry in the San Francisco area—Shockley Transistor Corp., Fairchild Semiconductor Corp., and Rheem Semiconductor Div. All are relative newcomers and growing fast, and the story of how they came into being illustrates the shuffle that has been going on in the industry. It also shows how a bright young man can make a pile of money in semiconductors in a few short years.

The story began four years ago, when William O. Shockley, one of the three Nobel Prize-winning inventors of the transistor, took a friendly departure from Bell Labs to set up on his own. Gathering young scientists from industry and campuses, he established Shockley Laboratories, Inc., which obtained financing by becoming a wholly owned subsidiary of Beckman Instruments, Inc.

Shockley's strategy was to avoid the production scramble based on Bell patents. Instead, he decided to concentrate on devising new products that could be patented themselves. The company turns out only one high-production item—the Shockley diode, a four-layer device used for extremely fast switching.

• **Exit Eight**—In 1957, eight of Shockley's young Ph. D.s began to chafe at what they later termed the new company's "stultifying pace." After a vain attempt to put more emphasis on production, they resolved to leave, under the leadership of Robert N. Noyce, who had come to Shockley from Philco. So they approached the investment house of Hayden, Stone & Co. and, with its help, found backing from Fairchild Camera & Instrument Corp., which was looking for new ways to diversify. Hayden, Stone and the eight young men (the oldest is now 36) formed Fairchild Semiconductor Corp.

Each of the eight owned 10% of the new outfit's stock; Hayden, Stone held the remaining 20%. Fairchild Camera agreed to underwrite expenses for 18 months in return for an option to buy 100% of the shares—an option it finally exercised last October by giving in exchange 19,901 shares of its own stock. At current market price, the deal gave each of the original eight more than $500,000 worth of Fairchild Camera stock.

Fairchild Semiconductor started to make money in late 1958, and 1959 sales were slightly more than $7-million. With more than 1,000 employees, it's the leading maker of silicon diffused junction transistors. Fairchild Camera has never revealed how much it poured into the subsidiary before these results appeared, but says it never suffered unusual expenses of more than $350,000 a year during that period.

• **Close Rival**—Since 1957, another 10 or so Shockley employees have followed the first group to Fairchild. Fairchild also got an infusion of seven men from Hughes Semiconductor Div. including Ewart M. Baldwin, hired as vice-president and general manager.

But Baldwin stayed with Fairchild only a year. In the spring of 1959, he and eight others quit to form Rheem Semiconductor, a division of Rheem Mfg. Co., a maker of oil drums, furnaces, water heaters, and air conditioners. Rheem built a plant only a few blocks from Fairchild Semiconductor's.

Fairchild, miffed by the defections, has filed a suit against its exemployees, Rheem Semiconductor, and Rheem Mfg. charging that they took with them some of its confidential material. Meanwhile, Rheem is rushing to get into production with its high-speed diffused silicon switching transistor. It has been turning out fast switching silicon diodes in volume since last November.

The Industry Prepares for Its Future

What lies ahead for the semiconductor industry?

The business is obviously still in ferment. This is plain from almost every facet of its youthful personality. When will the brew stabilize?

At the moment it faces new imponderables, any one of which could have a drastic effect:

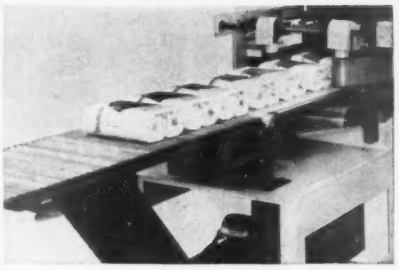
• The sudden upsurge of foreign competition.

• The results of still further probing into the many areas still unexplored. This could bring a revolution in materials, new devices, more improvement of existing products, and wide new markets.

The Peril Overseas

Rivalry from abroad is relatively new to U.S. semiconductor makers. But it's already stiff—and it will get worse.

Japan is currently the most potent competitor. Imports of Japanese transistors, mostly of entertainment quality priced at 50¢, rocketed from 11,000 units worth $7,000 in 1958 to 1.8-million units valued at $1.1-million in the first nine months of 1959. That's still



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Size of Product	Packages Per Year	Approximate Savings Per Year
3" x 5" x 1"	6 million	$ 3,393
8" x 11" x 4"	6 million	22,185
9" x 15" x 6"	6 million	38,367

Here's how these savings are calculated. If your product is item #2 above, you need about 425 sq. inches of film, including overlap, to wrap it. Based on an output of six million packages per year, your approximate annual cost for polyethylene film would be $53,040. Conventional wrapping film would cost you about $75,225. Your savings by using polyethylene film—over $22,000. Remember, too, that polyethylene also saves more of your packaging dollar through less wrapper breakage—in storage, in transit, and on retail counters.

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UNION CARBIDE

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Abandon hope— or buy more now?

The market has turned its back on the oil stocks—and rather indiscriminately.

In the face of waning hopes for individual issues, the latest Value Line analysis of petroleum stocks finds 7 to be well-deflated—their prices standing far below intrinsic values—indicating the probability of relatively strong price performance during the coming year and potentiality for further appreciation over the next 3 to 5 years!

Each of these 7 stocks now carries the Value Line's *Group I (Highest) Rank* for *Probable Market Performance in the next 12 Months*—and no less than 12 of the oil stocks rank equally high for *Appreciation Potentiality to 1962-64.*

As for the rest—careful! Recent developments have indeed conformed to the probabilities forecast in the Value Line *Fortnightly Commentary* of January 12, 1959. In this analysis the maladjustments in the petroleum industry were found to be of such a fundamental character as in all probability to influence the operating trends in the oil industry for several years to come. The situation is developing almost exactly as then foreseen and probably will continue to do so. A copy of this still-timely analysis of the petroleum industry, together with the *new* report mentioned above, will be sent to you as part of a special offer:

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Gulf Oil	*Stand'd Oil (Cal.)*	*Getty*
Imperial Oil	*Stand'd Oil (N.J.)*	*Richfield*
Phillips Petrol'm	*Union Oil*	*Sun Oil*
Pure Oil	*Tidewater*	*Sunray*
Royal Dutch	*Texaco*	*El Paso Nat. Gas*
Shell Oil	*Amerada*	*Panhandle East'n*

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SEMICONDUCTORS

CLARENCE ZENER, 54, director of Westinghouse's research laboratories, is best known for his studies leading to the Zener diode, a semiconductor device that regulates voltage. He has a Harvard Ph.D., taught physics at Chicago.

far short of a significant share in the U.S. market, but the growth is explosive. And U.S. customers bought $37.5-million worth of Japanese radio receivers, the majority of them transistor sets, in the first nine months last year—twice as many as in all of 1958.

Texas Instruments, for one, claims that its 50¢ entertainment-grade transistors can meet this competition from the Orient. But it fears that the imports of transistor radios might cut into U.S. radio production—and thus slice the demand for U.S. transistors.

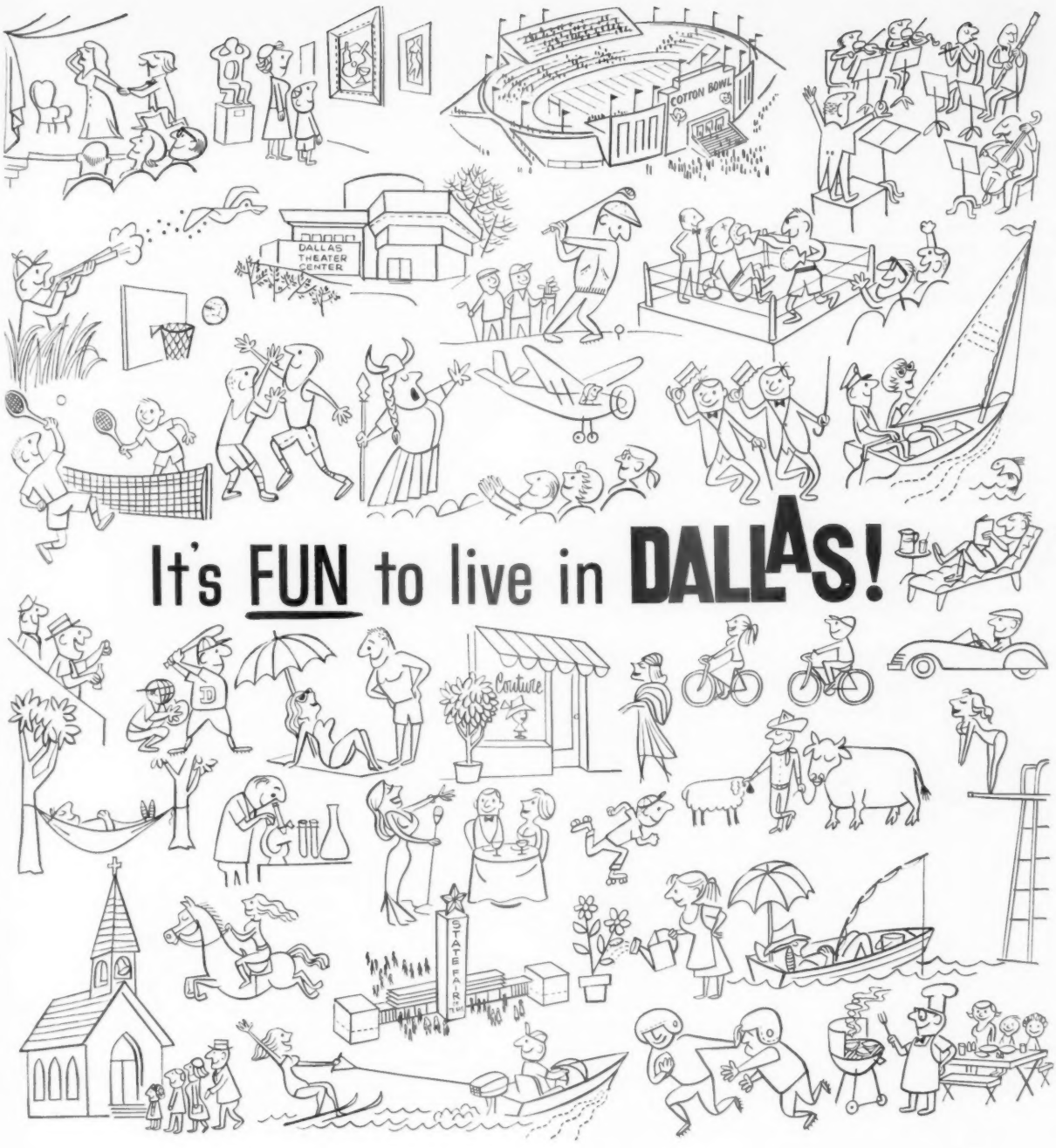
• **European Knowhow**—A growing semiconductor industry in Europe is also a threat. It has been perhaps a year or so behind the U.S. in know-how, but it's catching up fast. The leader at present is probably Philips of Eindhoven; among its exploits is an unusual alloy-diffusion process employed to make a low-priced, high-frequency transistor. This device is being manufactured in the U.S. by Amerex Electronic Corp. of Hicksville, N.Y., a subsidiary of North American Philips Co., Inc.

U.S. and foreign semiconductor companies have a variety of deals to exchange technical and financial help. GE, for example, is related to two Japanese electronics outfits—it owns 7% of Toshiba and has given some of its licenses to Hitachi. Westinghouse has licensed Mitsubishi to make its rectifiers. Many U.S. companies have set up foreign subsidiaries and built plants abroad.

In reverse arrangements, Westinghouse holds U.S. rights to a process for producing ultra-pure silicon developed by Siemens & Halske, a German concern. Japan's Sony Corp. has given both GE and RCA a good deal of aid in developing the tunnel or Esaki diode, named for its inventor, the Japanese physicist Dr. Leo Esaki. GE was one of the first to turn out tunnel diodes in quantity. Just last week it an-

SEMICONDUCTORS

CONYERS HERRING, 45, heads a group of eight men at Bell Labs who devote their entire time to theoretical physics. Among the objects of their attention: the general electron theory of metals.



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SEMICONDUCTORS

J. M. EARLY, 37, a Ph.D. in electrical engineering, is one of the Bell Labs researchers who played an important role in developing the diffused base transistor.

nounced a new tunnel diode, made of gallium arsenide, that may push operating frequencies as high as 4,000 mc.

Quest for New Materials

The gallium arsenide in GE's new tunnel diode is one of the semiconductor materials that hold promise for the future. It and other elements such as bismuth telluride may prove very useful in some jobs, particularly at high temperatures and frequencies. Other elements under study, including tungsten carbide and diamond, won't be competitive without more breakthroughs in metallurgy, although Transitron is marketing a silicon carbide rectifier. Researchers are working feverishly to perfect new materials, partly because of a hope that they will open new uses for semiconductors.

For a long time to come, though, germanium and silicon will undoubtedly hang on to their dominance.

• **Suppliers**—In materials, the prospect that gives the industry most pause is that technology might make it possible for today's material suppliers also to become competitive producers. Such a shift could conceivably shake the entire business.

Currently, some semiconductor materials come from outside suppliers, some from captive sources. Almost all germanium oxide is purchased from companies outside the industry, but Sylvania produces its own.

The biggest suppliers of semiconductor-grade silicon are du Pont and Merck & Co., in first and second places respectively. Allegheny Electronic Chemicals Co. produces various types of silicon; W. R. Grace & Co. is producing it by a French process in Puerto Rico, and at least four other chemical companies are planning to get into the act: Dow, Monsanto, Mallinckrodt, and Foote Mineral. Inside the industry, Texas Instruments has built an extensive silicon plant to supply its own needs and also, it hopes, to supply others. And the Bakalar brothers of Transitron own their own raw materials source in Trancoa Corp.

• **Potential Change**—A change in supplier-producer relationships might come through development of new thin-film techniques to make semiconductor crystals. Merck, diligently at work in this area, has already produced single crystals of silicon in thin, flat form on glass by a vapor deposition method. Perfection of this technique would mean that the material wouldn't have to be sliced into thin sheets before it could be processed into transistors. It would take only one more step for the supplier to sell sheets with a diffused impurity layer built in. Without much more work, he could sell transistor dice all ready for wiring up.

This possibility isn't too far-fetched. There is some feeling that both the making and processing of super-pure materials belong to the chemical industry.

Whatever happens, Westinghouse has hedged its position well: It controls the U. S. rights for the Siemens process used by Merck to produce basic silicon. Westinghouse has also grown some very fancy semiconductor crystals in long, thin ribbons. Using these might make producing transistors like making spaghetti and chopping it into bits.

SEVEN solid circuits by Texas Instruments scarcely cover a dime.

Bell Labs is working on its own methods of growing flat and dendritic crystals.

The Richest Promise

In the development of devices using these materials, semiconductor companies are following two paths:

• Expanding the versatility of existing products such as transistors.

• Designing wholly new devices for new jobs.

It used to be that transistors were best for low-power, low-frequency chores, such as in a portable radio, but impractical at high power and frequency, as in a VHF radio transmitter. But transistors and other semiconductor devices are becoming more and more proficient. Just about the only place where they show no signs of competing with tubes is in extremely high-power uses, such as commercial radio transmitters and UHF microwave and radar transmitters.

As prices of powerful, high-frequency devices drop, some rich markets will open. When transistors come into the price range of present TV-set tubes, there will almost certainly be a mass shift away from tubes. Some predict the switch will begin this year. Auto radios will soon be completely transistorized.

• **Innovations**—Of the industry's new devices, the most excitement swirls around the Esaki diode, which amplifies a current by making use of an obscure phenomenon known as negative resistance. Bell Labs' Morton calls Esaki's work "a wonderful development." He adds: "Dr. Esaki very wisely investigated semiconductors doped to saturation. We didn't. . . . He deserves all the honor the industry can give him."

Researchers forecast a brilliant future for the Esaki diode in computers and as a high-frequency oscillator. A GE model of gallium arsenide has generated frequencies of 4-billion or 5-billion cycles per second—frequencies high enough to make it possible to build computers with the logical capacity of the human brain. Tokyo University scientists are working on just such a computer. The Esaki diode may also shine as a high-frequency amplifier in FM radio and TV sets, where it would be used in conjunction with transistors.

The new diodes were priced at upwards of $50 each in sample quantities, but in the last few weeks production models became available at $10 and $12.

• **Wrapping Packages**—Probably the most important of all developments is the work in circuit function packages—wrapping the entire works of something like a radio into one tiny, utterly dependable chunk. There are three simultaneous approaches to this project:

• The Army Signal Corps microminiature module, for which RCA holds the prime contract. Well along toward volume production, this involves putting transistor elements, resistors, and such on tiny ceramic squares, which are then stacked in a wire cage. The final unit is potted in plastic.

• A second technique, high in favor at Bell Labs. Whole circuits are placed on one ceramic disk, which is then encapsulated. This way, several transistors can be used without separate capsules.

• The solid circuit function package, also known as "molectronics," demonstrated by Texas Instruments and Westinghouse and under development

SEMICONDUCTORS

LEROY APKER, 44, manages the semiconductor studies section of GE's research laboratories. He has worked extensively on photoemission from semiconductors. His Ph.D. is from the University of Rochester.

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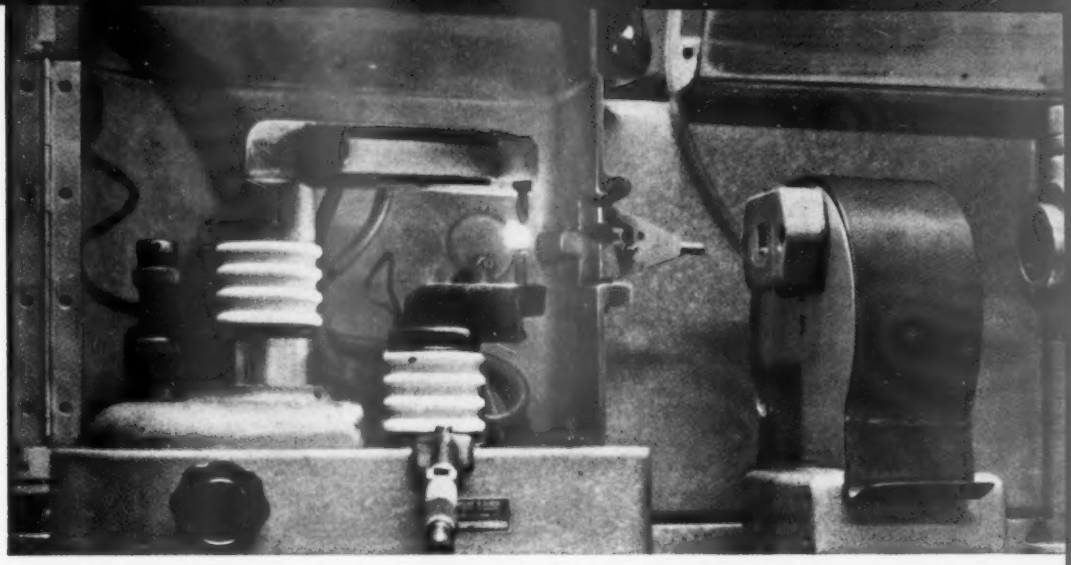
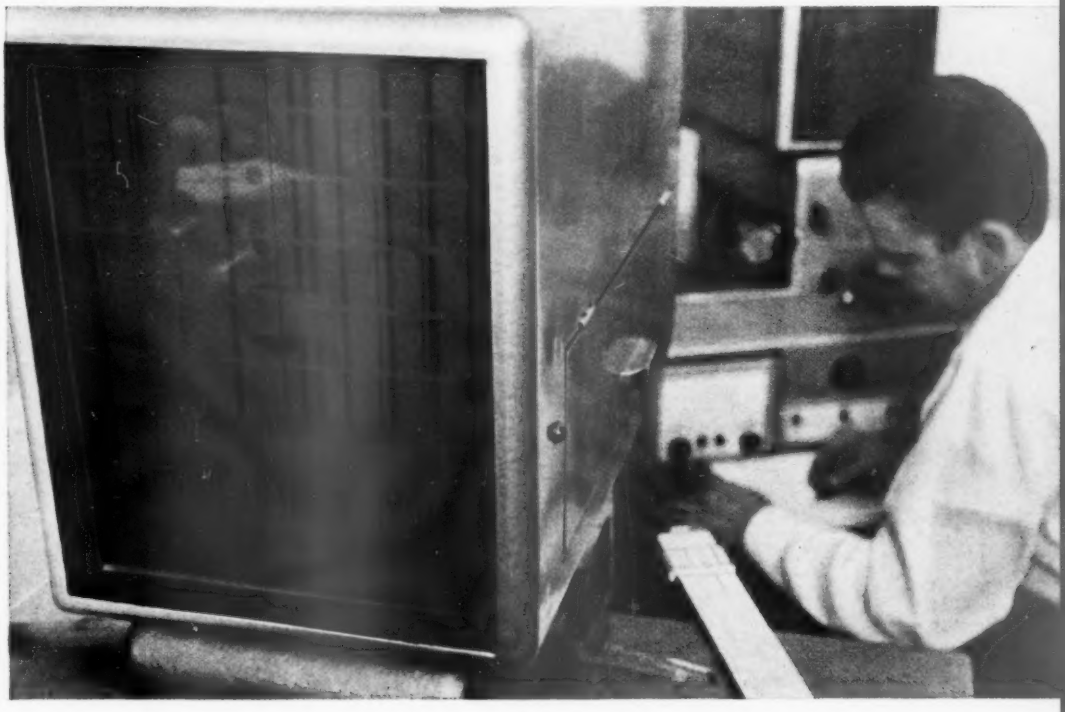


Emission Spectrograph (above) causes undesirable elements in a petroleum sample to emit their characteristic light spectrum which is photographed on a strip of film. In the Densitometer (below) the spectrum on the film is evaluated to identify the presence of metal contaminants down to less than one part per million.



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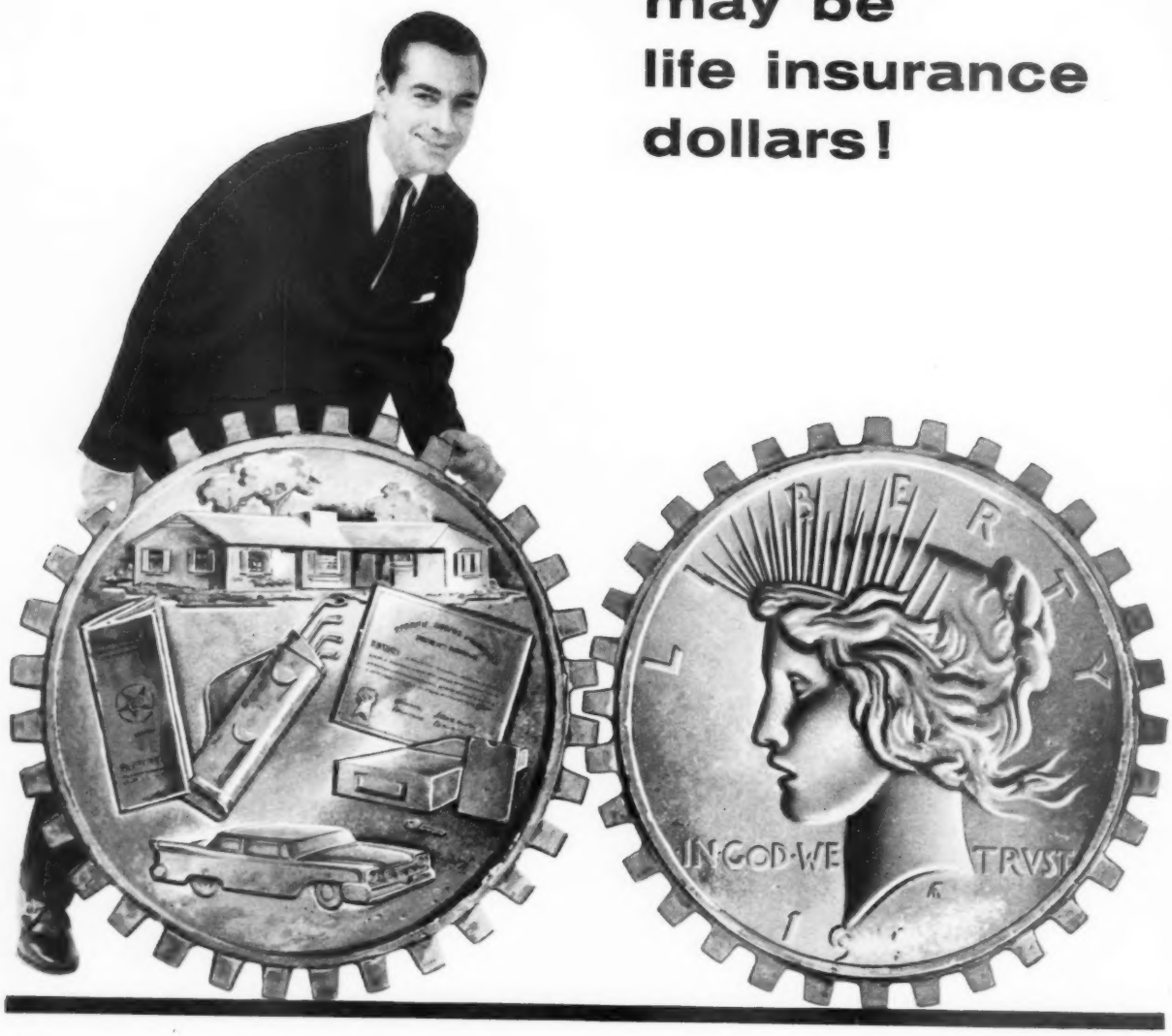

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R. W. WALLACE, 44, director of solid state electronics research at Bell Labs, began his career in 1940 with studies of magnetic sound recording. He figured importantly in development of the first point contact transistors.

in many other labs. The semiconductor crystal itself is used as resistor, transistor, and capacitor—even under a microscope, the elements can't be separated. By eliminating most interconnections, this method may well bring a huge improvement in reliability. Texas Instruments has shown off a computer counter that normally would be as big as a shoebox, with more than 80 different elements. Using solid state circuits, it has only 11 elements and is no bigger than a lead pencil's rubber eraser. Westinghouse has devised a phonograph amplifier the size of a single transistor.

• **Doubts and Rebuttals**—Many engineers still doubt that circuit function packages will ever be economically practical. But most in the industry disagree. A Texas Instruments engineer describes how his company can use a single crystal of silicon for a device that would have formerly been made up of more than a dozen components costing $100 in all. "It's not only more reliable," he says, "eventually it will be considerably cheaper."

That single silicon crystal is no bigger than a match head, but it contains the guts of a two-tube radio.

The industry won't stop at swallowing up the vacuum tube. If no one else makes products containing circuit function devices, it may make them itself. One executive who refused to be identified "because I always make a fool of myself by underestimating," predicts: "The industry will pass the billion-dollar level in two years with just the devices it now has in production. Add circuit functions, and you can double that figure."

Concludes Bell's Morton: "There's not a shred of doubt in my mind that electronics will soon be the largest industry in the U.S., thanks largely to solid state devices."

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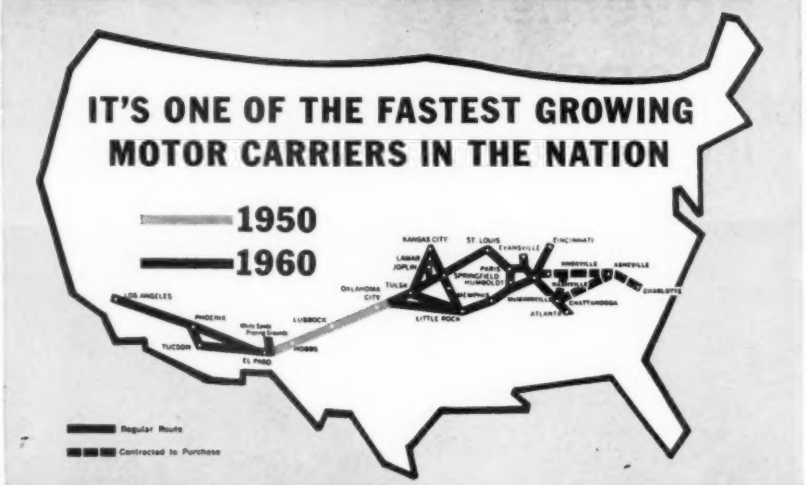
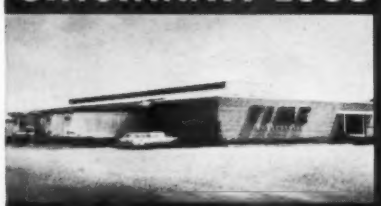


CINCINNATI 1958



ATLANTA 1959

ST. LOUIS 1960

The fabulous Fifties were Fabulous indeed for TIME . . .

In that short, ten year span, TIME grew from a two state operation to a nationwide carrier, serving the nation's business and industry all the way from the Pacific Coast to the heart of the industrial South and booming Midwest.

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REGIONS

Building

Personal incomes across the nation took a giant step from December to January, setting a new record for monthly advance, 3.4%. The wounds inflicted by the prolonged steel strike were healing nicely and the country was getting back to business as usual. Biggest monthly gains showed up in the South and Southwest due to the combined effects of brisk construction activity and mounting factory jobs.

BUSINESS WEEK's Measure of Personal Income scored the biggest annual improvement since last July. January, 1960, was 6.7% better than the same month last year. Factory jobs were 742,000 more plentiful than a year ago but still half a million below January, 1957. Most of the gains over the year centered in hardgoods. The employment setback in durables resulting from the steel strike had been mostly made up by January, but job losses in nondurable goods which occurred during the last half of 1959—notably in food, tobacco, and petroleum—had not yet been recovered.

• **Farms in Florida**—Twenty-four states and the District of Columbia matched or bettered the national average in year-to-year improvements. For the fifth month in a row, Florida was out in front with a 14.6% increase. All major segments of the Florida economy are vigorous, including, surprisingly, farming which is in a serious slump in most other states. Last year, Florida farmers managed to score a 20% increase over 1958's realized net income per farm, a feat topped only by Arkansas with a 22% rise.

Farm states remained the only losers in the year-ago comparison of total personal income and showed little sign of getting any better. North Dakota (−12.8%) suffered a substantial drop in revenues from wheat and flaxseed. In fact, throughout the Great Plains, January marketings of wheat were sharply below a year earlier. Corn Belt states which raised and harvested the biggest corn crop in the nation's history now face a king-sized headache—too much moisture in the grain. Much of the corn is too "wet" to seal in the government loan programs. Rejections of corn for government loans have run as high as 28% to 30% in some communities.

The livestock situation also bears watching. The cattle and calf inventory was the highest for January in 93 years, setting the stage for increased competition for the beef dollar.

(For story on South Carolina see page 126)

ng factories Spur Sweeping Gains

MEASURE OF PERSONAL INCOME

	Millions of Dollars				(Seasonally Adjusted)			
	12 MOS. 1958	12 MOS. 1959 REVISED	% CHANGE 1959 VS. 1958	1953-55 MONTHLY AVERAGE	JANUARY 1959	DECEMBER 1959	JANUARY 1960	% CHANGE VS. YEAR AGO
Alabama	$4,378	$4,605	+ 5.2%	$286.4	$377.1	$374.5	$405.4	+ 8.3%
Alaska	600	686	+ 14.3	41.9	58.5	60.1	64.4	+10.0
Arizona	2,207	2,436	+ 10.4	126.9	186.8	195.1	203.8	+ 4.5
Arkansas	2,177	2,286	+ 5.0	153.5	185.0	176.9	191.8	+ 3.7
California	36,712	40,206	+ 9.5	2,341.7	3,201.2	3,463.3	3,550.4	+10.9
Colorado	3,502	3,765	+ 7.5	217.2	307.7	322.6	337.8	+ 9.8
Connecticut	6,545	7,014	+ 7.2	440.7	559.5	579.1	601.8	+ 7.6
Delaware	1,253	1,361	+ 8.6	78.6	106.7	118.7	120.3	+12.7
District of Columbia	2,180	2,299	+ 5.5	158.2	186.7	193.1	203.8	+ 9.2
Florida	8,340	9,352	+ 12.1	456.8	727.8	837.2	834.0	+14.6
Georgia	5,689	6,054	+ 6.4	383.2	486.5	490.0	532.2	+ 9.4
Hawaii	1,159	1,272	+ 9.7	76.0	104.6	111.4	111.9	+ 7.0
Idaho	1,133	1,173	+ 3.5	74.5	96.0	95.2	100.7	+ 4.9
Illinois	24,091	26,115	+ 8.4	1,677.5	2,081.8	2,155.9	2,222.2	+ 6.7
Indiana	9,130	10,021	+ 9.8	663.5	802.8	830.9	868.6	+ 8.2
Iowa	5,269	5,554	+ 5.4	357.3	468.5	462.0	453.8	− 3.1
Kansas	4,235	4,314	+ 1.9	281.8	371.9	356.5	375.7	+ 1.0
Kentucky	4,312	4,437	+ 2.9	307.1	374.6	362.4	358.5	− 4.3
Louisiana	4,907	5,068	+ 3.3	318.3	410.4	400.8	425.2	+ 3.6
Maine	1,622	1,673	+ 3.1	112.8	134.8	141.3	144.6	+ 7.3
Maryland	6,566	6,868	+ 4.6	432.3	574.6	579.0	608.1	+ 5.8
Massachusetts	11,642	12,415	+ 6.6	799.8	1,005.9	1,030.2	1,081.4	+ 7.5
Michigan	16,552	18,291	+ 10.5	1,234.1	1,459.6	1,495.4	1,586.5	+ 8.7
Minnesota	6,472	6,836	+ 5.6	434.8	551.8	578.3	591.1	+ 7.1
Mississippi	2,305	2,393	+ 3.8	160.9	192.2	185.1	199.4	+ 3.7
Missouri	8,703	9,182	+ 5.5	600.9	756.0	772.9	798.1	+ 5.6
Montana	1,327	1,317	− 0.8	92.3	113.9	102.2	105.8	− 7.1
Nebraska	2,759	2,897	+ 5.0	182.5	247.4	247.6	255.1	+ 3.1
Nevada	688	765	+ 11.1	43.1	61.9	64.3	66.9	+ 8.1
New Hampshire	1,102	1,151	+ 4.4	75.2	93.9	96.5	100.8	+ 7.3
New Jersey	14,495	15,476	+ 6.8	982.9	1,251.3	1,332.0	1,345.6	+ 7.5
New Mexico	1,553	1,591	+ 2.4	91.8	131.2	128.3	137.5	+ 4.8
New York	42,006	43,619	+ 3.8	2,887.9	3,559.7	3,713.8	3,796.2	+ 6.6
North Carolina	6,318	6,729	+ 6.5	429.0	551.4	556.7	597.3	+ 8.3
North Dakota	1,103	1,054	− 4.4	67.4	95.1	79.6	82.9	−12.8
Ohio	20,423	22,550	+ 10.4	1,476.3	1,770.8	1,893.2	1,967.5	+11.1
Oklahoma	3,975	4,040	+ 1.6	268.5	334.1	340.0	352.3	+ 5.4
Oregon	3,557	3,833	+ 7.8	249.8	312.8	322.9	334.0	+ 6.8
Pennsylvania	23,650	24,574	+ 3.9	1,678.6	2,031.6	2,045.4	2,121.8	+ 4.4
Rhode Island	1,716	1,853	+ 8.0	129.9	146.9	155.1	161.1	+ 9.7
South Carolina	2,931	3,123	+ 6.6	210.0	255.9	268.1	279.7	+ 9.3
South Dakota	1,147	1,154	+ 0.6	73.7	98.7	93.3	93.1	− 5.7
Tennessee	5,000	5,367	+ 7.3	345.9	446.6	428.0	449.8	+ 0.7
Texas	17,053	17,556	+ 2.9	1,132.9	1,460.7	1,453.4	1,497.3	+ 2.5
Utah	1,518	1,634	+ 7.6	98.1	136.2	133.4	145.5	+ 6.8
Vermont	649	701	+ 8.0	45.9	57.0	57.6	58.7	+ 3.0
Virginia	6,586	6,803	+ 3.3	383.3	556.8	561.6	579.1	+ 4.0
Washington	5,985	6,316	+ 5.5	418.0	523.5	535.0	545.4	+ 4.2
West Virginia	2,975	3,131	+ 5.2	209.7	257.6	252.5	258.6	+ 0.4
Wisconsin	7,622	8,077	+ 6.0	528.2	661.4	685.7	694.9	+ 5.1
Wyoming	669	671	+ 0.3	45.9	57.7	53.9	57.2	− 0.9
NATION	$358,488	$381,658	+ 6.5%	$24,363.5	$30,983.1	$31,968.0	$33,055.6	+ 6.7%

January figures preliminary; December and January, 1959, revised.

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3. BUILT-IN "SHOCK ABSORBERS"—Specially designed Westinghouse anodes act as buffers to cushion the terrific shock of electron bombardment and improve lamp life.

4. "RAINCOATS" FOR RELIABLE STARTING—Silicone "raincoats"

six important advances that make it a better buy!

disperse moisture which can collect on exterior surfaces and prevent lamps from starting.

5. **MIXED GASES**—Westinghouse uses a precise mixture of certain rare gases, under exact pressure, to improve the light output.

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South Carolina's New Plant Boom

State hikes share of industrial building contracts from 1% to 5% with variety of new firms, diversification of textiles.

On U.S. Highway 321, just south of Cayce and six miles from South Carolina's capital of Columbia, workmen last week began to dig a hole for a new manufacturing plant. The company didn't identify itself to avoid a flood of applications.

The hole aroused such curiosity that Gov. Ernest F. Hollings felt obliged to explain it. He had agreed to disclose only that the company would employ 500 and make a product new to the state, but even that was enough to make the next morning's front pages. By next afternoon, the Columbia Record had pried out of somebody that the plant would make dolls.

• **Construction Boom**—Excavations for doll plants hardly would stir reporters in other areas, but in South Carolina every new plant causes excitement. That's because the sleepy Palmetto State awoke last year to find new plants shooting up all over—from the hustling Piedmont section to romantic Charleston.

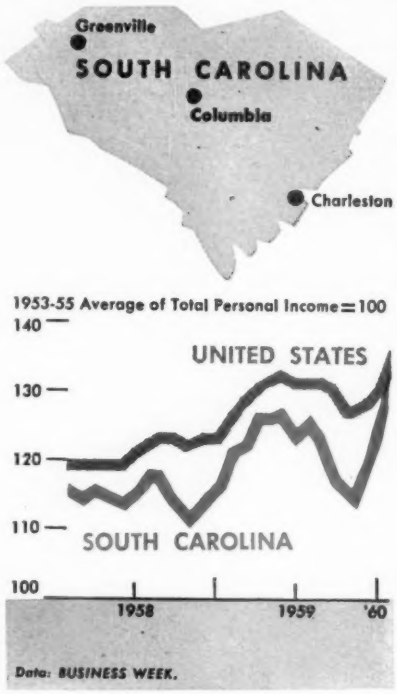
The boom isn't just a native's vague impression or a politician's boast. Figures prove it. After coasting with 1% or so of U.S. industrial building contracts for several years, South Carolina last year soared to 5% of the total—or $155-million—according to Construction Daily, a McGraw-Hill publication.

This year, the boom is continuing. Just this month Parke, Davis & Co. announced it would buy 100 acres at Greenwood to build a plant for surgical dressings. Last weekend Dunlop Tire & Rubber Corp. announced it would build one to make golf balls at Westminster.

Even though industrial construction in the states perked up only so recently, it already is being felt.

Economically, it shows up not only in construction and manufacturing jobs but also in secondary businesses such as trade, banking, and services. They haven't benefited this much from industrial construction since the Atomic Energy Commission built its Savannah River plant at Aiken in 1952-4. The over-all effect is evident in BUSINESS WEEK's Measure of Personal Income (chart).

Socially, the repercussions are more gradual. Owners of marginal farms and idle farm hands in the central belt and low country now can slightly improve their standard of living by getting jobs in the few factories being built nearby—instead of in the Piedmont Region. It's in the future prosperity of these farm areas that Gov. Hollings puts the greatest hope for better relations between poor whites and the Negroes who make up a high percentage of the population.



• **Built-in Handicaps**—To understand fully the impact of the new plant construction in South Carolina, you have to know something about its over-all economy:

• It long has been a state with a low per capita income. Only Mississippi's is lower.

• Its agriculture has required fewer and fewer workers.

• Though the state had a high ratio of manufacturing jobs to non-farm employment, most of these were in textiles, a low-paying industry. And even textiles has been providing fewer jobs because of greater automation.

• Southern custom and insufficient training have prevented most of the state's high number of Negroes from rising above common labor or domestic work. Many Negroes have gone North, leaving families behind.

• A large share of the population is not in the labor force—because of youth (South Carolina's birth rate is higher than the U.S. rate) or because of indifference toward work.

South Carolina has had a hard time overcoming these built-in handicaps. They explain why the state has to run hard to get new plants just to stay even. They also explain why, despite all the new companies that have moved in with new plants, the state's per capita income still is 59% of the U.S. average—just as it was in 1950.

But even though South Carolina's per capita income has failed to gain on the national average—while its population has grown at almost the national rate—the absolute increase in dollars has been felt. "You see fewer 10-year-old cars around today than you used to," says a Columbia car dealer. "We used to sell grits and sowbelly, and now people don't want that," says a supermarket operator in the more industrialized Piedmont section. "People now have two cars and a boat in every garage," says Pres. W. W. McEachern of the South Carolina National Bank. "We're financing boats all the time."

• **Strength in Diversification**—Behind this new atmosphere—the absence of "poor mouth" talk—lies a very important economic fact: diversification. The state's per capita income may not have gained on the U.S., but the sources of income have become more diverse. This has given the state's economy a most welcome strength, says James A. Morris, professor of economics at the University of South Carolina.

The diversification has occurred in three areas: in agriculture, in over-all manufacturing, and within textiles itself.

• **Agricultural Change**—South Carolina agriculture has changed through the years. It changed from the large cotton plantation to the small tenant farm with a handful of hogs, a patch of cotton. But there was little diversity until recent years. Since then, the state has come to rely less on cotton and tobacco, and increasingly on cattle, dairying, poultry, peaches, oats, and wheat.

• **Industrial Growth**—Textiles accounts for 54% of the manufacturing jobs—still big, but less than its 63% share during the Korean War. Among the state's other manufacturers, no industry has matched the growth of apparel—from 12,000 jobs in 1950 to 28,000. Although its low pay hasn't helped to improve per capita income much, the state does benefit from having apparel plants locate in small towns to absorb the available supply of women workers.

A relatively new growth industry is chemicals—which now ranks fourth behind the declining lumber business. It became important just after Korea with the completion of the atomic energy facilities at Aiken, operated by E. I. du Pont de Nemours & Co. The industry provides 12,500 well-paying jobs (one-tenth of textile employment).

In addition, in recent years there has been growth in pulp and paper; stone,

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clay, and glass; non-electrical machinery, and electronics.

• **Textile Diversification**—During this period of general industrial expansion, the textile industry moved toward greater diversification. The significance was explained by Pres. Hugh C. Lane of the Citizens & Southern National Bank of South Carolina this way: "It means that we're not tied any more just to a sheet and a pillow case."

For years after the bulk of the cotton textiles industry moved South, South Carolina plants were engaged in the elementary, low-paying work of spinning. But the state's plants have become more integrated. More weaving and finishing operations have been established, providing better paying jobs. And now South Carolina competes with North Carolina for the title of No. 1 cotton consumer.

• **Woolen Mills**—Woolen and worsted textiles have come South. The woolen manufacturers were attracted by the same factors that attracted the cotton industry: lower labor costs, less unionization. The one thing that had deterred woolen manufacturers was distance from raw material.

But all that began to change in the mid-50s with the establishment of two wool combing and scouring plants near Charleston—in effect, making Charleston the wool port of the South. With their coming, the southward flow of woolen and worsted textile mills stepped up, and Charleston's wool import tonnage now is gaining on Boston.

Equally significant has been the expansion of synthetic fibers, particularly in blends with natural fibers. South Carolina benefits not only from being near the synthetic fiber centers of North Carolina and Virginia, but it also has a few fiber plants itself and is getting more.

• **No Concessions**—Contrary to other Southern states, South Carolina has not felt it necessary to offer concessions to attract its new plants. It passed a right-to-work law in 1954, and revised the corporation income tax, as many states have, to base it on sales, payroll, and capital.

• **Local Contribution**—What concessions have been made have been at the local level. A number of chambers of commerce and county development boards have been raising private capital to build plants for prospects.

When Ernest Hollings became governor last year, at 37, he was determined to increase the state's role in industrial development. Mindful of the prominence won by North Carolina's Gov. Luther Hodges, Hollings felt it was time for more ballyhoo—and honest-to-goodness spadework—for South Carolina.

• **Official Action**—Before his Jan. 20 inauguration, Hollings had helped to draft a budget that expanded the State Development Board and increased the board's funds from $338,000 to $539,000. After he took office, he took on the Orangeburg Chamber of Commerce manager, S. Ernest Wright, as his personal "industrial assistant," then hired Walter W. Harper, one of Gov. Hodges' key men, to run his own board.

• **Motive**—Gov. Hollings believes industrial development is the best way to raise his state's per capita income. By getting new payrolls, he reasons, he can help the state collect more taxes, raise its spending for schools, turn out better people who can qualify for better jobs.

This year, Hollings asked the legislature to study the need for industrial training schools to qualify more of South Carolina's young people for the skilled jobs new industries offer.

• **Key Question**—The question that South Carolina Negroes will ask is whether their young men, once technically trained, will be able to get skilled jobs. As far as Gov. Hollings is concerned, they will. He told BUSINESS WEEK this week he will encourage companies to hire them.

Race relations are commanding much of the governor's attention. He had to deal with demonstrations last week at the State College in Orangeburg and with efforts by young Negroes to sit down at lunch counters in dime stores. At first he tolerated sit-downs to permit Negroes to "make their point." When they began to demonstrate in large numbers, he asked them to stop.

It was his fear of riots by whites that persuaded the governor to ask the police to break up the demonstration of 400 Negroes in Orangeburg.

"They may have got wet or got a tear in their eyes," he notes, "but there's nobody in a hospital in South Carolina. There are people in hospitals in other states."

Some Negroes, such as Dr. Alphonse Powe of Allen University, a Methodist school outside Columbia, are convinced of Gov. Hollings' sincerity, but wonder whether the governor is "doing all he can do." Dr. Powe felt that the young Negroes are more concerned about job opportunities than counter service and that the governor could relieve their dissatisfaction by "just a small concession"—such as permitting Negro girls to take clerical jobs in state offices.

In the meantime, with job opportunities above the common labor level hard to find, many Negro men are migrating north for jobs. Many of them are married men who figure at first on going north only temporarily, but eventually bring their families up. Some send only for their wives, and Dr. Powe noted: "It's alarming to find a large number of children living with their grandparents." END

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A complete message center in a compact cabinet, with a choice of components to best meet your individual needs—that's the story of the Teletype Model 28 automatic send-receive set.

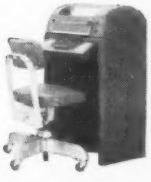
It provides facilities for sending and receiving on message paper or sprocket-fed business forms. In addition, there is a choice of four different tape reader and four different tape punch components—for preparing punched tape and for sending and receiving with tape.

The flexibility of the set is further broadened by a built-in control unit, the "stunt box," which may be equipped for a wide variety of extra features and switching duties—eliminating the need for external apparatus often required for such functions.

The ASR set is a compact, efficient tool to speed communications and cut costly paperwork. Why not investigate what it can do for you?

Typing Tape Punch

Tape Reader



Send-Receive Page Printer

Automatic Send-Receive Set

FREE LITERATURE: Write for Model 28 "Complete Product Line" brochure Teletype Corp., Dept. 15C, 4100 Fullerton Ave., Chicago 39, Illinois.

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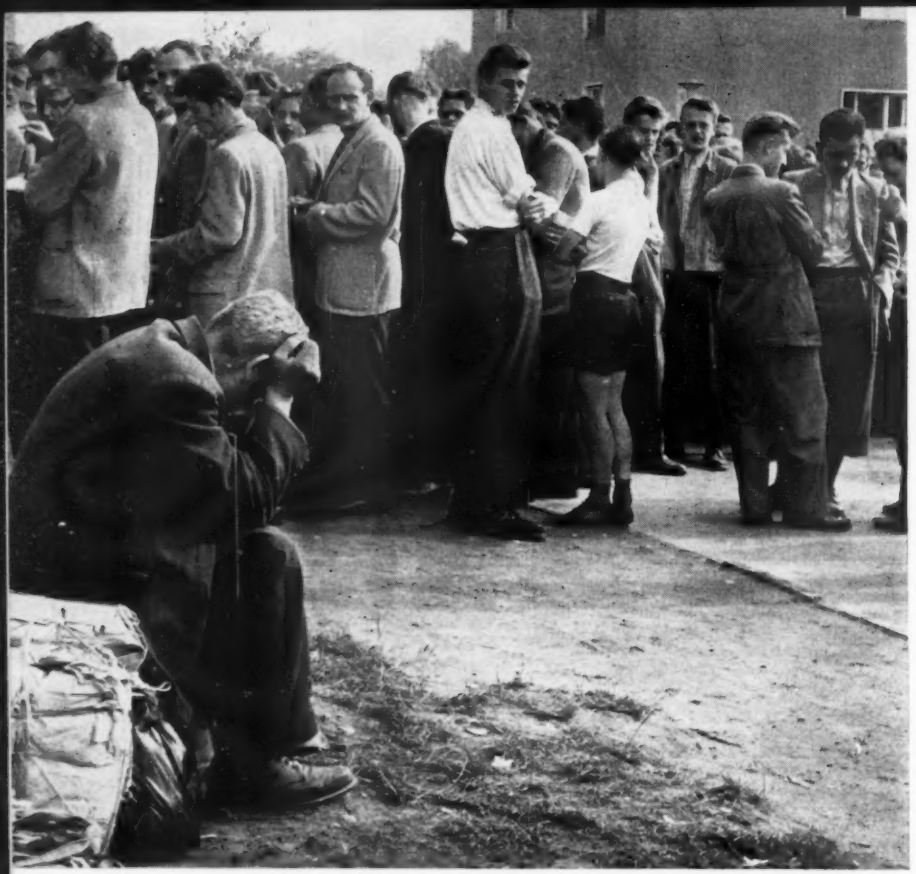

REFUGEES from East Germany flock into West Berlin at the rate of about 10,000 a month. But many who crossed over in the peak years are returning to their old ties.

BUSINESS ABROAD

Communist Ge

Although still shackled by Soviet domination, East Germany is building new political and economic strength.

While Konrad Adenauer was politicking for West Germany in the U.S. last week, his thorniest problem—Communist East Germany—was growing ever more difficult for the old Chancellor to live with.

Not only was the Soviet satellite putting on more industrial weight, it appeared to be breaking out of its diplomatic isolation by the non-Communist world.

Despite Pres. Eisenhower's assurances that the West will stand firm on Berlin and not leave West Germany in the lurch, these developments—reported by a BUSINESS WEEK correspondent just back from East Germany—could bring only distress to the 84-year-old Bonn leader:

East Germany is building a new political posture for itself on the world scene. With 29 trade missions already established in the free world, East Germany's Pankow government is eager to open more on the theory that trade

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ASSEMBLY LINE in VEB "Sachsenring" Automobilbau Zwickau is slated to increase production of the small car Trabant from 20,000 in 1958 to 65,000 in 1965.

MARKET PLACE in Rostock features many 17th Century buildings that survived heavy bombing during the war. Ground floors are used by a government sales organization.

Germany Flexes New Muscles

often presages diplomatic relations. Until recently, only Yugoslavia outside the Soviet bloc had recognized East Germany. Now Guinea apparently has done the same. It looks as though some other young African nations may follow suit.

Economically, East Germany has come up fast. Although still shackled politically by Soviet-directed, Communist rule, East Germans are living better and their industry is expanding. The German Democratic Republic (the country's official name) claims to be the fifth industrial power in Europe after the U.S.S.R., Britain, West Germany, and France. On a per capita basis, East Germany's gross national product was about half that of West Germany's back in 1953; today, it's about 80%. With things looking up in the Communist satellite, the refugee flow to the West has dropped from 279,000 in 1956 to 144,000 last year. In the same period, refugees going East from West Germany have increased by a third to 40,000.

Within the Soviet bloc, East Germany seems to have won a bigger voice on its own affairs than it has had before. Some argue that the G. D. R. may have attained the same kind of quasi-sov-

SHIPYARD in Rostock is being expanded and modernized to take away business from Hamburg as a transit point to Czechoslovakia and to handle trade with Western Europe.

MAY DAY parade on Marx-Engels Square passes under banner reading "For a Demilitarized Free Town West Berlin."

ereignty accorded by Russia to Czechoslovakia, Hungary, Rumania, Bulgaria, and Albania. All, of course, are bossed to a great extent by the Soviet Union. Although Adenauer still speaks of East Germany as a "Russian colony"—and no one would have contradicted him in the years following 1949 when the "German Democratic Republic" was formed—the picture has been changing.

All of this, of course, doesn't alter one whit the essential political fact of life in East Germany: It is a Communist-ruled country, with all that this implies for the freedoms of speech, press, and even art. East Germans are expected to serve their state, and the state still has a big duty to Moscow.

• **New Diplomatic Ties**—At midweek, young Pres. Sekou Toure of Guinea still had not cleared up the confusion that resulted from the announced diplomatic recognition by his country of East Germany on Mar. 5. Asked by Bonn to confirm or deny the report within 72 hours, Toure kept silent. So has West Germany, which had threatened to break off diplomatic relations if Toure confirmed publicly that Guinea had recognized the Soviet satellite.

Meantime, East Germany has established a Consulate-General in Cairo which the United Arab Republic has accorded a kind of quasi-diplomatic status; it flies the East German flag at times, holds receptions for trade delegations, and sends out formal messages (such as congratulations) to diplomats from other countries. There are reports that Ghana is considering recognition. For most nations of Africa and Asia, in fact, it's a good bet that they see little reason for withholding diplomatic recognition from East Germany other than fear of retaliatory action by West Germany.

• **Implications**—For the West, East Germany's growing diplomatic stature has two implications. It strengthens Khrushchev's public claim that the German Democratic Republic is a sovereign country entitled to formal agreements between itself and the U.S., Britain, and France on Western access to Berlin—without the U.S.S.R. as intermediary. Almost without doubt, the Soviet Premier will push this point at the May Summit.

For another thing, it weakens Adenauer's insistence that there is only one sovereign German state—namely his, the German Federal Republic. Should an East German ambassador turn up at the United Nations in the future, and request the same observer status enjoyed by West Germany, it will be a neat trick for Dag Hammarskjold to turn him down.

• **Trade Missions**—Following the old prewar Soviet pattern of using trade to gain diplomatic recognition, East Germany has "official" trade missions in non-Communist nations almost around the world—virtually all of them in underdeveloped countries such as India, Ghana, Guinea, Iraq, Uruguay, Argentina, Colombia, Brazil, and Cuba. Among free countries hosting "unofficial" (East German Chamber of Commerce) missions are Britain, France, Italy, Turkey, and the Scandinavian nations.

Still, only one-fourth of East Germany's foreign trade is with the non-Communist world. Most of this trade, ironically, is with West Germany, which likes to admonish other Western countries on having anything to do with East Germany.

The Soviet Union itself accounts for nearly half of East Germany's total foreign trade turnover of 16-billion marks (official rate: 4.2 marks to the U.S. dollar). In fact, East Germany runs neck-and-neck with Communist China as the U.S.S.R.'s chief trading partner.

• **New Era**—Behind a fourfold increase in foreign trade since 1950, there have been almost tumultuous changes in East Germany. A new era started in 1953 after Stalin's death and the savage East Germany uprisings. For one thing, Russia's one-way milking operation began to slow down. By yearend, the Soviets had sold back to East Germany the cream of the industrial plants confiscated after the war and operated as Russian corporations.

At first, the East Germans suffered from a hectic, disorganized cult of production for production's sake. Then they laid down a new organizational pattern aimed at industrial self-sufficiency. This, at least, brought order to output of machine tools, capital equipment, optical and precision instruments, and chemicals.

At the same time, East Germany concentrated on building a new industrial complex at Stalinstadt for iron and steel, a lignite mining and processing combine at "Schwarze Pumpe," a cokery at Lauchhammer, new shipyards on the Baltic Coast at Rostock, Wismar and Stralsund, and other projects.

• **Russia's "Marshall Plan"**—Then, in 1956, came Hungary and Poland. To help stabilize East Europe after the uprisings in these countries, the Soviet Union ordered increased coordination of satellite economies within the framework of the Council of Mutual Economic Relations—Russia's hitherto ineffective answer in 1949 to the Marshall Plan.

For East Germany, a reinvigorated COMECON meant two things. It marked the country as an integral member of the bloc with a leading role in chemicals and construction for all East European countries. And as countries within the bloc began sharing tasks, it removed some of the immediate burdens of trying to stretch resources and a shrinking manpower pool.

In addition, the Russians eased up on East Germany's economy a bit by extending long-term credits and allowing deferment of East German payments for exports. There was no drastic transformation in which the Soviets began to sacrifice their own national interest for the East Germans. But there was more give-and-take in trade bargaining.

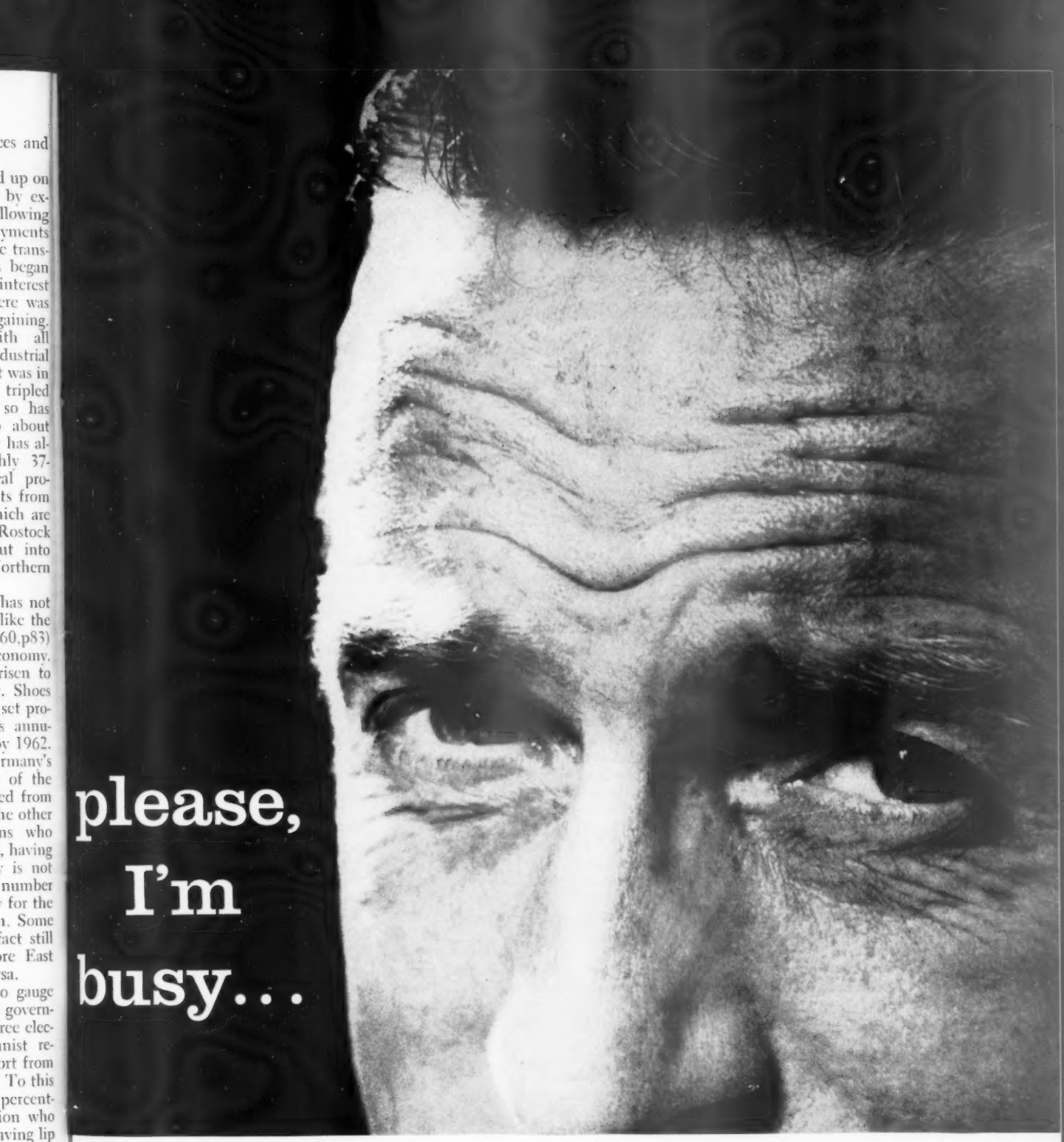
• **Impact on Production**—With all these changes, East German industrial production is double now what it was in 1950. Crude steel output has tripled to more than 3-million tons; so has rolled steel production, up to about 2.5-million tons. Electric power has almost doubled, rising to roughly 37-billion kilowatt-hours. Chemical production is expanding—with assists from West Germany and Britain, which are supplying some equipment. Rostock harbor is being enlarged to cut into Hamburg's preeminence as Northern Europe's leading port.

The East German consumer has not been forgotten, though he has—like the Russian consumer (BW—Jan.23'60,p83)—a secondary priority in the economy. Cotton fabric production has risen to 217-million square meters a year. Shoes are up to 1.6-million pairs. TV set production, now at 100,000 units annually, is scheduled to quadruple by 1962.

• **Migration Trend**—East Germany's economic upswing is only part of the reason refugee flow has decreased from East to West and increased in the other direction. Many East Germans who crossed over before are returning, having found out that West Germany is not automatically a golden land. A number of refugees leave West Germany for the other side to avoid conscription. Some want to rejoin families. The fact still remains, however, that far more East Germans go West than vice versa.

• **No Yardstick**—It's difficult to gauge popular support of a totalitarian government that never has allowed a free election. East Germany's Communist regime is said to have active support from 10% to 15% of the population. To this may be added about the same percentage of East Germany's 18-million who opportunistically stick around paying lip service. By most accounts, this total of 20% to 30% is roughly double what it was in 1956 before Hungary and Poland. But there still are open pockets of resistance, particularly among farmers who don't like being pushed into collectives.

With the 2.4-million Germans who have deserted the G.D.R. for the West since the war have gone many of those who found the Communist regime most intolerable. For those who stayed behind, West Berlin remains a gleaming and modern reality and not a Communist promise. **END**



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WESTERN UNION

Ex-Im Bank's New Export Role

Main features of Bank's key part in Administration export drive are now clear; here's how its new system of short-term export credit guarantees will operate.

The Export-Import Bank of Washington, most venerable of the U.S. government's international financing institutions, is gearing up this week for a new type of operation.

Starting in about two months, Ex-Im will offer U.S. exporters a new system of export guarantees covering political risks in short-term transactions—up to 180 days. Although the Bank, at various times during its nearly 30 years of existence, has provided short-term financing for exporters on a spot basis, it has tended to concentrate on medium and long-term credits. This will be the first time that it will offer a comprehensive and continuing system of short-term export credit guarantees.

In addition, Ex-Im will expand cooperation and participation with commercial banks in the medium-term credit field—credits of one to five years. The Bank hopes in this way to increase the amount of medium-term credit available to exporters.

• **Key Element**—Ex-Im's expanded activities constitute the key element in the government export drive (BW—Mar.12'60,p26), launched officially by Pres. Eisenhower last week. This drive, in turn, is the heart of the Administration's answer to the continuing U.S. balance of payments deficit—something that threatens to undermine U.S. trade and aid policies if it is not checked.

The President explained the goals of the export promotion program in a special message to Congress last week in these terms: "Expanded exports can add substantially to the millions of jobs already generated for our people by export trade. At the same time, our export surplus contributes significantly to our capacity to sustain our expenditures abroad for investment, private travel, maintenance of U.S. military forces, and programs of foreign economic cooperation."

• **New Program**—Only the broad outlines of Ex-Im's short-term guarantee system have been roughed out so far. The bank will fill in the details in a series of conferences during the coming weeks with commercial bankers and representatives of insurance companies interested in insuring short-term export credit against commercial losses.

But this much can be said already:

• Guarantees on short-term transactions will be limited to political risks. If exporters want guarantees or insurance against normal commercial losses, they will have to look to private institutions.

• Contracts guaranteeing against political risks usually will cover these points: 90% of the risk of nontransferability or nonconvertibility of foreign currencies; losses resulting directly from war, civil strife, and expropriation; losses resulting from the imposition of import restrictions.

• An exporter obtaining a guarantee agreement would be required to declare all his eligible export shipments and pay fees on them to Ex-Im. Fee schedules have not yet been set. But they will vary from country to country of destination, and from time to time, in accordance with Ex-Im's evaluation of the political climate in various places.

This will give the Bank a flexible tool for covering or limiting its own risks. In an extreme case—Cuba at the moment, for example—the Bank simply could declare that exports to a given country were ineligible for political guarantees until further notice.

• **Speeding Up Service**—In the medium-term credit field, where the Bank already is active, it will seek to improve and speed up its service by relying more heavily on the credit judgment of commercial banks.

For example, whenever a commercial bank is prepared to finance (for its own account and without recourse to the exporter) the first three or four semiannual installments of a three-year to five-year credit, Ex-Im will finance the remaining installments. The foreign buyer, however, must pay 20% down, and transactions must be in markets acceptable both to the commercial bank and to Ex-Im.

• **Disagreement**—It's impossible at this stage, of course, to make even a wild guess as to how much Ex-Im's new guarantees will stimulate U.S. exports. Ex-Im officials contend that with the new guarantees U.S. exporters will have credit facilities available to them, from public and private sources, roughly equal to those available to their European competitors.

This is disputed by some exporters and by some U.S. officials. But everyone agrees that credit, at best, is only one element in the total export climate. Unless U.S. exporters have goods to sell that people abroad want to buy, competitively priced, marketed, and serviced, no amount of credit will help much.

• **Record**—Ex-Im Bank's new role is a logical extension of its historical evolution. Old timers at the Bank like to boast that since its founding it has adjusted flexibly to changing international economic challenges. Thus this new response to new challenges is seen as a continuation of a long-standing tradition. The history of the Bank—it has provided more than $10-billion of credits on everything from fountain pens to steel mills—tends to bear them out. (Ex-Im has earned a gross income of approximately $1-billion.)

The Bank was founded in 1934, specifically to finance trade with the Soviet Union—just recognized by the U.S.—and beyond that, as a general tool for expanding U.S. exports during a period of depressed world markets. Soviet-U.S. trade didn't amount to much as it turned out, and world markets were too depressed to absorb much Ex-Im credit. So the Bank did only a small volume of business prewar.

During the war Ex-Im did a land office business in all types of export financing, particularly to Latin America. It was during this period that the Bank extended short-term credits to U.S. exporters on an ad hoc basis.

• **Postwar**—Financing lend-lease goods in the pipeline and European reconstruction were the two big jobs in the immediate postwar period. Ex-Im also began large-scale financing of U.S. cotton exports to Japan and Europe, an activity that still continues.

By the early 1950s, economic development in industrially backward countries began to absorb more and more of the Bank's attention and funds. This continues to be the most important of Ex-Im's activities in dollar-volume terms. But Europe's economic recovery, by 1954, pushed Ex-Im into offering direct medium-term credit to U.S. exporters to help them meet increased European and Japanese competition.

• **Variety**—A report recently prepared by the Celanese Development Co. provides a useful listing of the types of credits granted by Ex-Im:

Development credits, with which the Bank supports construction of large projects abroad, both private and public.

Commodity credits, assisting the sale abroad of U.S. commodities such as cotton.

Emergency credits, which enable foreign governments or central banks to weather financial trouble without cutting normal trade with the U.S.

Exporter credits, which assist U.S. manufacturers in completing sales of capital goods abroad.

It's in this fourth area that Ex-Im now is broadening its facilities. **END**

A. P. GREEN REFRACTORIES SERVE THE WORLD'S INDUSTRIES

REFRACTORIES PAVED THE WAY

for the 146,000 mile network of U.S. concrete highways

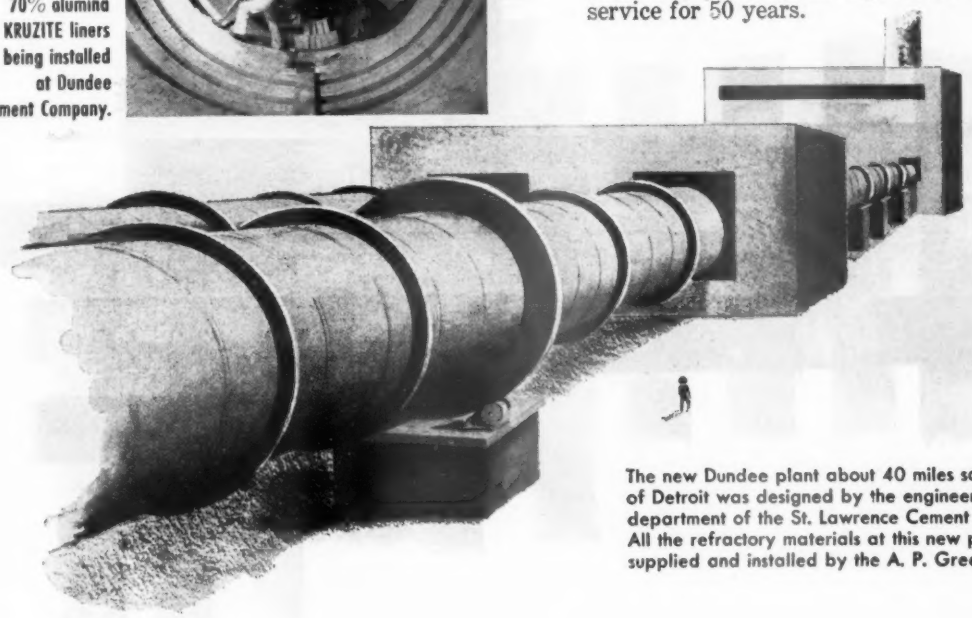
From Washington to Alabama, California to the Carolinas — 48 of our states are united by broad highways of concrete. The federal highway program now in progress calls for an additional 41,000 miles . . . they'll begin in the nation's vast cement kilns — kilns that must be lined with high quality refractories.

The refractory products and engineering skills of the A. P. Green Company were used most recently in lining the two 16½ ft. diameter rotary wet process kilns of the Dundee Cement Company, Dundee, Michigan.

The first of these kilns has already proven itself with an output of 8000 U.S. bbl/day . . . surpassing any other cement kiln on the American Continent.

The cement industry is just one of the basic industries of the world in which A. P. Green refractory products have provided excellent service for 50 years.

A. P. Green 70% alumina KRUZITE liners being installed at Dundee Cement Company.



The new Dundee plant about 40 miles southeast of Detroit was designed by the engineering department of the St. Lawrence Cement Company. All the refractory materials at this new plant were supplied and installed by the A. P. Green Company.

50 FIFTY YEARS OF PROGRESS A. P. GREEN FIRE BRICK CO.

A. P. GREEN FIRE BRICK COMPANY
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MANUFACTURERS OF A COMPLETE LINE OF HIGH QUALITY REFRACTORIES INCLUDING: FIRE CLAY, HIGH ALUMINA, SEMI-SILICA, SILICA, MULLITE, SILICON CARBIDE, ZIRCON, AND BASIC PRODUCTS.

In Business Abroad

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Bradley Fish Steps Into Commerce Spot Vacated by Asst. Secy. Henry Kearns

The new Assistant Secretary of Commerce for International Affairs is Bradley Fish (picture), 55-year-old former Buffalo department store executive. He succeeds Henry Kearns, who resigned last week.

Fish, who had been Kearns' deputy for the past year, is considered a marketing expert. He says he will continue Kearns' policies, which centered on winning a bigger voice in trade policymaking and spearheading the Administration's export trade promotion program.

Washington observers say that Fish personally is less colorful and dynamic than Kearns—and less controversial. Kearns incurred the wrath of the textile industry in particular with his contention that imports are not hurting the domestic industry.

• • •

World Bank to Aid Iron Ore Project In West Africa, Highway in Japan

The World Bank last week announced two loans, totaling $106-million, for development of iron ore in the West African Republic of Mauritania and construction of a 45-mi. expressway in central Japan.

In Mauritania, the Bank lent $66-million to the Societe Anonyme des Mines de Fer de Mauritanie (Miferma) for mining equipment and facilities, a 415-mi. railway from the mine to the Atlantic coast, and port facilities. Open pit reserves are estimated at 115-million tons of ore similar to high-grade Swedish and South American ores.

In Japan, a $40-million loan will help pay for a four-lane highway between Osaka and Kyoto, in the country's most heavily populated and industrialized region.

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Organic Chemical Manufacturers Protest Slated Reductions in Duties on Imports

The Synthetic Organic Chemical Manufacturers Assn. (SOCMA) last week sounded a protectionist call to arms. This is another plea to Washington for protection against import competition (BW—Mar.19'60,p143).

The group's president, Samuel G. Baker, warned that **the Trade Agreements Committee has been compiling lists of commodities slated for import duty reduction at next fall's meeting of the General Agreement on Tariffs & Trade (GATT).**

Most industries will wait for publication of the list in April to take action. But Baker, who is general manager of Organic Chemicals Dept. at du Pont, advised SOCMA members to protest to Washington before the list is made public. He recommended that each company appoint a top executive who can go to Washington on short notice to plead his company's case.

If their products are not removed from the barter list, Baker said the company representative should be prepared to present his case at public hearings before the Committee for Reciprocity Information and the Tariff Commission in mid-April.

• • •

U. S. Book Publishers Urge Government Help Fight Taiwan's Pirated Editions

The U.S. book publishing industry is rallying government forces to fight a rapidly increasing incursion of books pirated by printers in Taiwan (Formosa).

Industry sources estimate that the Nationalist Chinese have duplicated some 1,500 titles without paying copyright royalties to U.S. authors and publishers. They have shipped $1-million worth of books to the U.S. in the last year, up from $100,000 worth the year before. **The books sell for one-quarter to one-third the U.S. price.**

Next month, industry representatives will cite these facts to the Senate Finance Committee and the House Appropriations Committee during hearings on foreign aid. The printing equipment used in Taiwan was purchased with U.S. foreign aid funds.

U.S. book publishers want the government to demand that Chiang Kai-Shek's regime stop exports of the pirated volumes. One U.S. publisher says this is the only practical way to stop sales of these books in the U.S. The U.S. can't stop the pirating nor sales of such books in Taiwan, he says.

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Cunard and BOAC Bury Rivalry In Quest of More Transatlantic Trade

Cunard Steam-Ship Co. Ltd., owner of the "Queen" liners, has joined hands with its main transatlantic competitor—the airline business. **In a surprise move, the company announced an agreement to purchase 60% of Eagle Airways, a small British-owned independent airline.**

At the same time, flag-carrier British Overseas Airways Corp. said it "is exploring with the Cunard company possible ways and means in which Cunard and BOAC might collaborate to further British interests across the Atlantic." A Cunard tie-up with BOAC could mean a close working arrangement on round-trip ticket sales for transatlantic passengers.

Eagle Airways has concentrated on special tour flights to the Continent and troop chartering for the British government. It also has a Montreal-New York-Baltimore-Miami-Nassau run.

Republic Aviation Corp. has agreed to buy one-third interest in Royal Netherlands Aircraft Factories Fokker for about $1-million.

Lacrosse, U.S. Army's most accurate surface-to-surface missile
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INTERNATIONAL OUTLOOK

BUSINESS WEEK
MAR. 26, 1960

Pres. de Gaulle welcomed Nikita Khrushchev to Paris this week amid signs that a new political crisis is looming in France—something that is bound to weaken de Gaulle's hand in dealing with the Soviet Premier.

There's no danger that de Gaulle will knuckle under to Khrushchev on, say, Western rights in Berlin. He will stick with Chancellor Adenauer on that issue. Moreover, the General will take a dim view of Soviet disarmament talk.

But Khrushchev won't be impressed with de Gaulle's tough stand on these issues. He knows that diplomatic positions are only as firm as the national power behind them. And the wily Soviet leader will be able to spot —and exploit—the growing weakness of de Gaulle's regime. (Some French diplomats wonder this week whether de Gaulle miscalculated badly in asking Khrushchev to visit France.)

The main thing undermining de Gaulle's political strength is his failure to make any visible progress toward an Algerian settlement. Until recently the General had overwhelming backing in France, except from the extreme right. Even the Communists soft-pedaled attacks on him. But much of the General's support, especially from moderate groups, was based on their belief that he was the only man to bring peace to Algeria. Now that this hope is fading, other differences are coming into the open—over farm policies, labor policies, de Gaulle's high-handed methods of government.

There is some danger that the National Assembly will pass a censure motion against the government during de Gaulle's trip to the U. S. next month. That could touch off a political crisis which might force the General to cut short his U. S. visit.

There's not much chance that de Gaulle can be toppled from power any time soon. Nor is he likely to resign in a huff. But he may be forced to make increasingly dictatorial moves. He has just refused to call a special session of the Assembly to deal with farm problems, despite the demand for such a session from a majority of its members. This may be a foretaste of what's to come.

Sooner or later, de Gaulle must end the Algerian war or face the collapse of his regime. If he falls, even civil war would be possible.

There is no prospect of an Algerian settlement today. Rumors of new peace feelers between the French and the Algerian Nationalists are heavily discounted in Washington. Even if negotiations could be started soon, the odds would be heavily against a workable compromise.

The basic fact is that any solution acceptable to the Algerian Nationalists would be unacceptable to the French Army in Algeria. The reverse is equally true.

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The outlook for agreement with the Russians on a nuclear test ban is a little brighter this week. But hard negotiating still lies ahead at the Big Three talks in Geneva.

It's the Russians who have introduced the new tone to the test-ban discussions. They have just agreed—conditionally—to the U. S. proposal for a ban limited to nuclear explosions above the 20-kiloton level, leaving small underground tests aside for the time being.

The rub is the Soviet condition—that there be a four- or five-year moratorium on underground tests, while joint research on detection methods

goes forward. If the U. S. agreed to this condition, it would have to postpone small-yield tests of military importance—without gaining solid assurance that the Russians wouldn't be forging ahead in this field.

The new Soviet offer has opened up policy differences in Washington, and between Washington and London.

Some State Dept. officials see a test ban as the best hope for making a start on a controlled scheme of general disarmament. (This is now under discussion at a separate ten-nation conference in Geneva.) So these officials are pushing for acceptance of some version of the Soviet moratorium, despite risks of Soviet cheating. **The British government** goes along with this position.

There is strong opposition in Washington, however, to any moratorium on small nuclear tests until a foolproof detection system is in operation. Both the Defense Dept. and the Atomic Energy Commission are skeptical of Soviet good faith. Moreover, both are anxious to resume a series of small-yield tests in both military and nonmilitary areas. And they have considerable backing in the U. S. Senate.

When the differences in Washington can be narrowed, the Administration will make Moscow a counteroffer. It may be something like this: We will go along with a moratorium on small tests, if the Russians will limit its duration to, say, 12 or 18 months and provide iron-clad assurances that joint research on detection methods would be pushed fast. We also would ask for Soviet agreement to adequate inspection against violations of the ban on larger atmospheric tests.

—•—

The Commerce Dept. has just reviewed the U. S. balance of payments. The review goes into details of last year's $3.7-billion deficit—and adds some sobering, if tentative, conclusions about what lies ahead:

- **Exports in the first quarter of this year should be up considerably,** but may tend to level off in succeeding quarters.
- **While there will be a drop in imports of some industrial materials** (steel and copper), over-all imports probably will increase. That's almost sure to be true of manufactured consumer and producer goods. (Last year imports of finished consumer goods were more than twice as high—relative of disposable incomes in the U. S.—as they were in 1937.)
- **Private capital movements may not be so favorable** to the U. S. as they were last year.
- **Over-all, there will be some improvement** in our payments position during the early part of the year. But the gains won't be sufficient to restore a reasonable balance in our foreign transactions.

The trends that Commerce has just analyzed, especially the growth of U. S. imports, have begun to produce strong reactions from some U. S. executives. This week Edgar M. Queeny, retiring chairman of Monsanto Chemical Co. (page 36), blasted the Eisenhower Administration for its foreign economic policies. In what seemed like a bid for both protectionism and an end to foreign aid, Queeny accused the State Dept. of showing "more concern for the welfare of the people and industry of Europe and Asia than those of the U. S."

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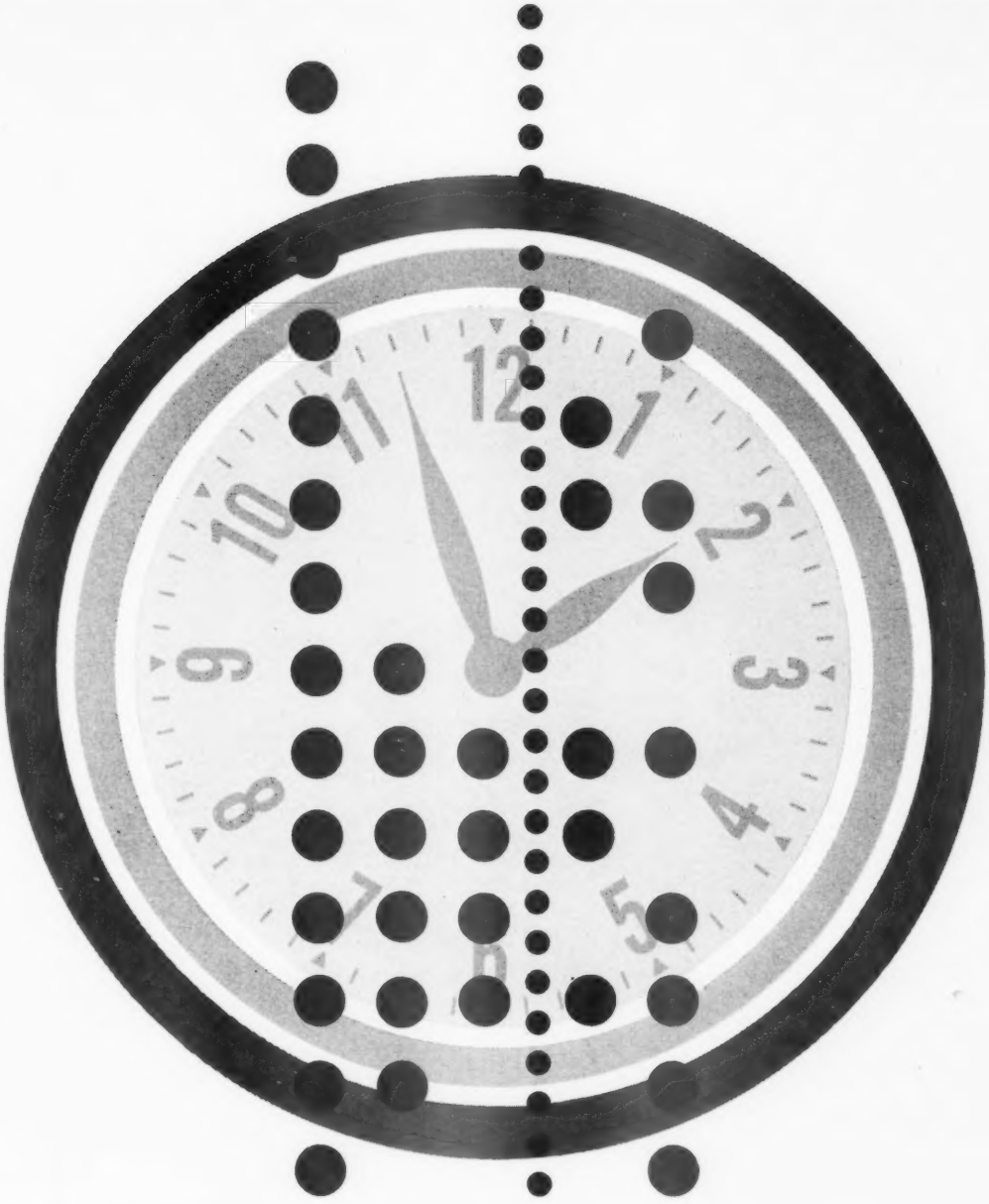

TAPE AND MICROSECONDS

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View of the RW-400 polymorphic data processing system, developed in The Intellectronics Laboratories of TRW. Close-up of operating panel is shown at left. (Photos by Don Mannix.)

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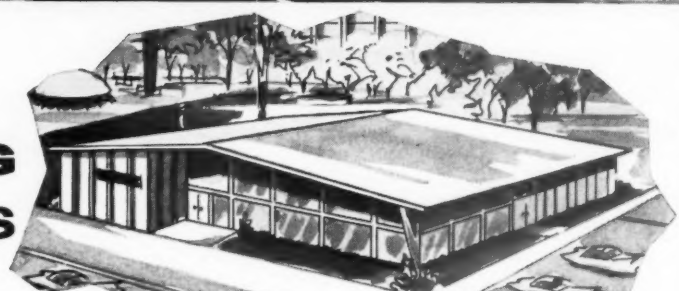

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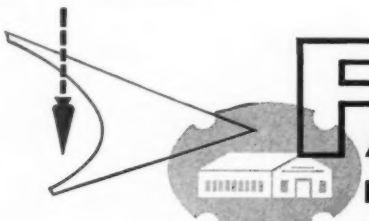

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RESEARCH

Polaris Heads for Showdown Test

Next week, Navy plans shots to prove range and ignition reliability, establish Polaris as nation's first line of defense during the missile gap.

Next week, the Navy will launch a series of tests that may affect all our military and diplomatic thinking for the next few years. It amounts to a showdown for the submarine-borne Polaris missile, the Navy's bid for the prime mission of plugging the missile gap.

The Navy is so confident of the outcome that, also next week, it is putting Polaris missiles into production at its new $26.5-million plant at Charleston, S. C. Major sections will be sent there by Lockheed Aircraft Corp., the prime contractor, and by subcontractors for assembly by naval personnel.

• **The Gap**—In a world of irascible and heavily armed nations, every American must feel unsafe as long as the Soviet Union outstrips the U. S. in number and perfection of intercontinental ballistic missiles. How far the U. S. lags and whether we're gaining on the Russians or dropping farther behind—these are vital questions. The answers vary according to which scientist, military man, or politician is talking.

Meanwhile, regardless of who has the most missiles, the U. S. has to depend on deterring Russia from pressing the attack button by keeping a force that could still retaliate punishingly after any conceivable attack. Without the assurance, recognized by the rest of the world, that we have the capacity to trade blow for blow, wipe out city for city, our foreign policies would be handcuffed.

• **What We Rely On**—Right now, for retaliation, we have manned aircraft and a few Atlas ICBMs in readiness. Other Atlases are in production, and the Titan ICBM is coming along. The Air Force claims that enough bombers could get through to targets to discourage any Russian idea of aggression; both the ICBMs can reach Russian targets from U. S. bases.

However, like the bomber bases, the ICBM sites are fixed and vulnerable. Both missiles are liquid-fueled, need much support equipment for firing; their bases presumably could be wiped out by a first salvo of enemy missiles. Our Thor and Jupiter intermediate-range missiles at bases overseas have much the same drawbacks.

We also have on the way the Minuteman ICBM, which is solid-fueled and can be fired from railway cars moved around the country to avoid offering a sitting target to an enemy. But they won't be operational for years.

That's where the Navy's Polaris comes in.

• **Ideal Stopgap**—The Polaris is a solid-fueled missile designed to be carried, 16 to the boat, by nuclear submarines. From under water, it is blown out of a vertical firing tube by compressed air, then ignited when it has reached 50 to 100 feet of altitude. With a range of 1,200 to 1,500 mi., it could reach almost any major Russian target from the seas bordering Asia.

Moreover, each Polaris-armed submarine is a power-packed, mobile missile base—hard to find and hard to destroy. Nuclear subs have proved their ability to remain at sea and submerged for months, even to tour icebound Arctic waters.

The Navy's aim next week is to prove (1) that the Polaris can live up to its advance publicity and (2) that Congress will be making no mistake if it puts up the money for an all-out Polaris program, even if it has to hold back on longer-range projects that don't affect today's missile gap. For the Navy claims a long-term military potential for Polaris, too.

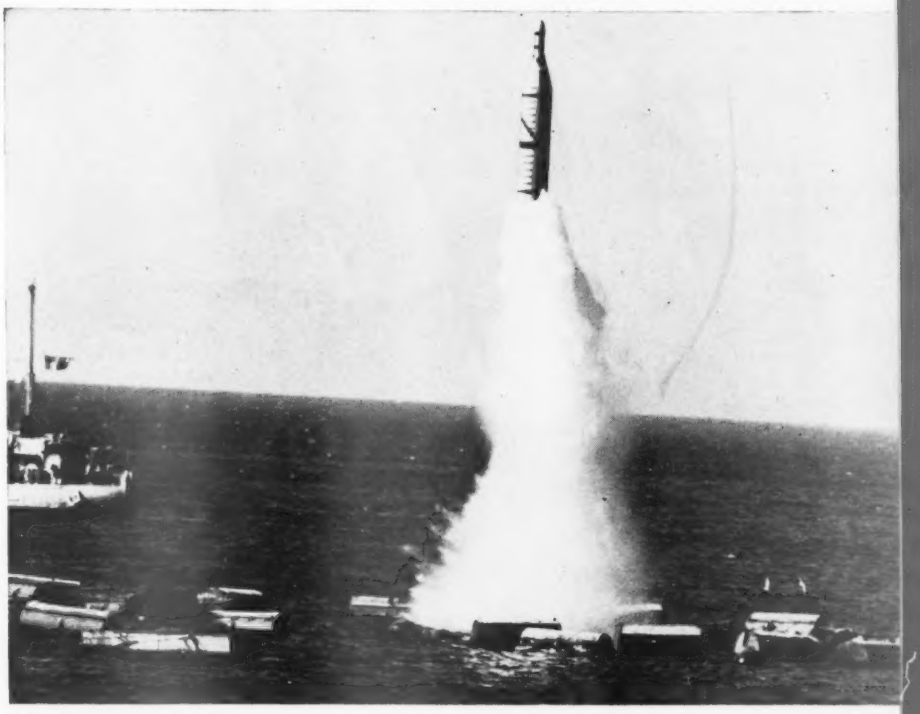
• **Waiting for Proof**—The tests starting next week may be crucial to the Navy's case. Primarily, the Navy needs a go-ahead from Defense Secy. Thomas S. Gates, Jr.—and Gates wants to see more proof before more money is pumped into Polaris.

The underwater launching of the missile is one of its novel features. The rocket's solid fuel isn't to be ignited until a fairly precise point above water. This is something new for a large missile, and it puts an unusual demand on the reliability and precision of the ignition system.

Another innovation in Polaris is its launching from a non-fixed base—a submarine, which can tilt in spite of special stabilizers. The submarine's own navigational system must tell it exactly where it is at the moment of firing, and the missile's system must function accurately in spite of tilting of the firing tube at the moment of launch or deflection by waves as it shoots up to the open air.

The new series of tests is designed to prove the Navy's confidence that Polaris won't be baffled by either problem.

• **Dummy Scrimmage**—Up to now, the Navy hasn't fired a fueled Polaris from underwater—just prototypes with ballast to represent fuel and warhead. Nor has it fired a Polaris over its full range of 1,200-1,500 mi. Only "test vehicles"



POP-UP PROTOTYPE of Polaris, with dummy warhead and ballast instead of fuel, soars from underwater launching by compressed air near San Clemente Island, Calif.

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. . . the first Polaris missiles will have a range of about 1,200 miles, but the Navy predicts that this range will be boosted to 2,500 miles in a few years . . .

(STORY on page 145)

have achieved distances of "more than 900 miles."

So far, the Navy has fired 32 test vehicles with 50% "complete" success, only one complete failure, and an assortment of partial successes. There was a successful firing at Cape Canaveral last week, the second in a series of 13 shots to prove out a new flight control system. Before the missile becomes operational, another 30 or so test shots are planned.

The compressed air ejection mechanism has operated with near-perfection, the Navy says, in firings from the ground, from the deck of a test ship, and from an underwater platform.

• **Supreme Tests**—Shots in the next two or three weeks are intended to convince all doubting Thomases, including Secy. Gates.

The first, next week, will be the Navy's initial attempt to ignite the main rocket engine after launching from underwater. The launching platform will be submerged at San Clemente Island, off the California coast. The test, however, will concentrate on the ignition system, not on full-range flight.

The second test will be a launching and firing off the test ship Observation Island. It will aim at a flight of more than 1,000 mi. to prove the missile's range capabilities.

Early next month, a second ejection and light-off firing will be staged off San Clemente Island to prove the first success wasn't a fluke.

The Navy feels it must prove its claims now, to offset any opposition in Congress to a speedup of the Polaris program. The first full-dress underwater firing from the first Polaris sub, the George Washington, isn't scheduled until midsummer. Congress will have gone home by then.

• **Subs on the Way**—The George Washington is due to go officially into service next fall. Three other Polaris subs have also already been launched: Patrick Henry, Theodore Roosevelt, and Robert E. Lee. A fifth, Abraham Lincoln, has a launching date of May 14.

Four other Polaris-armed submarines are under construction; items that require long lead-time are being bought for another three; and the 1961 budget provides funds for starting three others.

It takes about three years to build a Polaris sub. So the current schedule will complete one about every four months for the next three years. The Navy wants to step the timetable up to one a month.

The present program is based on eventual construction of about 45 Polaris submarines. Each submarine costs about $100-million, and its 16 Polaris missiles represent another $20-million.

• **Firing Procedure**—According to high Navy sources, Polaris missiles can be fired by a submarine at a rate of about one a minute and can also be fired in salvos, though the Navy won't say how many can be fired at once. The submarine can fire while surfaced or while running deep below the surface—how deep is another top secret.

To keep out of sight and also to escape surface wave action, a Polaris sub might ordinarily fire while submerged. This is how it would be done:

A hydraulic device would swing the steel hatch cover from the mouth of a firing tube, leaving just a plastic diaphragm over the tube to keep water out. The missile would be catapulated up through the diaphragm by compressed air, much as steam is used to catapult planes from aircraft carriers. A pre-set trimming device would ignite the rocket engine.

Meanwhile, water would rush into the firing tube, its weight compensating for the 28,000 pounds of missile to keep the submarine in trim.

The firing tube hatches will be equipped to be blown off if the hydraulic mechanism to uncover the tubes should fail to function.

• **It's All Automatic**—In its 15-min. flight to target, the Polaris is guided entirely by an inertial system. When the command to fire is given, the submarine's fire control center would feed data into the missile's electronic system: location of the target, the sub's location, and other navigational details.

Once the missile has been fired, it would be on its own. The Navy claims extremely high accuracy in test models of Polaris so far. Its accuracy, the Navy likes to boast, is comparable to the ability to throw a dart the length of a football field and hit a penny that's standing on edge.

The first family of Polaris missiles will have a range of around 1,200 mi., but the Navy predicts that propellants with greater thrust will boost this range to around 2,500 mi. in a few years. Since a single nuclear warhead could knock out a city the size of Washington, and each Polaris sub will carry 16 missiles, this constitutes a powerful weapon system, the Navy points out.

• **Sub Operation**—From October on, according to Adm. Arleigh Burke, Chief of Naval Operations, at least one Polaris submarine in full readiness will be at sea all the time. The Navy plans eventually to operate five squadrons of nine submarines each in all the oceans on the globe. Initially, Polaris subs will be based at Groton, Conn., but as more are added to the fleet they will be based elsewhere on both coasts, and eventually overseas also.

The Navy won't say whether the Polaris subs will operate independently or be paired with nuclear-powered hunter-killer submarines. Perhaps they will leave bases together, with the anti-submarine subs guarding against trailing of the squadron by enemy nuclear subs. Once at sea, however, the group would probably split up, partly because communication between submarines is poor at best and friendly subs might be confused with enemies.

Each Polaris submarine, the Navy says, will patrol a station roughly the size of Texas—a large haystack for an enemy submarine to search. Each will also have a certain amount of conventional torpedo armament with which to fight off enemy attack or to attack enemy surface ships.

• **Under a Long Time**—From the time a Polaris submarine leaves port, it will stay submerged. Each carries a dual crew: the blue and gold teams, each made up of 10 officers and 90 enlisted men, operating alternately. Crews will be trained at the Navy's guided missile school at Dam Neck, Va.

A Polaris sub's precise position must be known at all times if a firing is to be accurate. Its navigation equipment is based on SINS (Ships Inertial Navigation System), and its position is further corrected by an all-weather electronic "sextant," which is essentially a radio telescope. This device, housed in a retractable radome, is raised to the surface for a check on radio emissions from the moon, sun, and eventually the stars. These data are used to correct any gyro drift in the SINS system. The new sextant is being developed by the Precision Products Dept. of Nortronics, Inc., a division of Northrop, Inc.

While running submerged, a Polaris submarine will communicate with land bases through a network of low-frequency radio stations at Cutler, Me.; Annapolis, Md., Jim Creek, Wash., and Pearl Harbor, Hawaii. Another station may be built on Guam.

At sea, periodic and emergency service will be provided by special submarine tenders. The first of these, the Proteus, is now being converted from a conventional submarine tender at the Charleston Naval Shipyard, and a second is under construction. The tenders will be equipped to load and unload a sub's missiles, one assigned to each squadron of nine Polaris subs. **END**

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Managed Funds Gets a Manager

The outcome of a proxy fight over St. Louis mutual fund means Channing Corp. is in line for its advisory and sales contracts.

A battle that has been raging in the mutual fund industry since last spring came close to final resolution this week, with possible repercussions for the entire industry.

The controversy has centered on Managed Funds, Inc., a $58-million St. Louis-based mutual fund, and on the issue of who gets the profitable business of managing its investment portfolio and distributing its shares to the public. Mutual funds customarily farm out these jobs to companies specializing in such tasks, though the management and sales contracts frequently go to outfits closely related to the funds.

Until last spring, the investments of Managed Funds were supervised by the fund's founders, Hilton Slayton and his cousin, Hovey Slayton. Then the Securities & Exchange Commission forced out the two Slaytons on charges of "abdicating" their investment management responsibility. SEC contended that the cousins allowed a partner of Model, Roland & Stone, a New York brokerage house, to run the account—but continued to collect more than $1-million in management fees for the five years up to November, 1958 (BW—May 16'59,p155).

• **Channing Wins**—Ever since the SEC action, Managed Funds' shareholders have been without solid management for their holdings and share sales have been suspended. The maneuvering over who should succeed the Slaytons culminated in a bitter proxy fight in which the fund's shareholders had to vote on rival slates of directors, each representing a different investment manager.

That fight was finally decided this week in favor of Channing Corp.—but by a margin of less than 3% of the 17.8-million votes cast. The loser was Morris M. Townsend, a financier with wide interests in mutual fund management and sales companies. Channing's nominees won all nine seats on the board of Managed Funds, and it's now almost certain that the fund will award its management and sales contracts to Channing, though such contracts must first be approved both by the fund's shareholders and by SEC.

• **What It Means**—The victory establishes Channing as an important force in the mutual fund industry. Under Chmn. Kenneth S. Van Strum (picture), Channing manages and sells six funds that have grown in asset value from $30-million in 1954 to $218-million today. Managed Funds adds another $58-million to the total.

But for the industry as a whole, the very fact of the controversy over Managed Funds is a warning. In the future, the relationships between funds and the outfits that give them investment advice and sales help will be under much closer scrutiny. The Managed Funds situation led to an SEC investigation, still in progress, of the brokerage business that mutual funds dole out to brokers who also sell their shares or advise them. Information gathered in this probe seems to have been responsible, at least in part, for SEC's new rules on proxy statements, requiring investment companies to reveal more about their advisory and management contracts (BW—Feb.27'60,p123).

The issues raised by SEC apply to all investment companies. As one mutual fund man said this week: "Ten years from now, we may look back to Managed Funds as a real turning point."

I. The Intrigue Unfolds

Despite the SEC charges, the job of managing and distributing Managed Funds was regarded as a rich plum when the SEC action made it available. True, the fund had peak assets of only $81-million (during the controversy, this was reduced by heavy redemption of shares), compared to $1.5-billion for Massachusetts Investors Trust, the largest open-end company. But the profit potential still seemed lush enough to start a fight.

The jockeying began almost the moment the Slaytons resigned their posts as officers and directors of the fund. Among the first proposals were bids from Channing and Townsend. In fact, the day the Slaytons quit Channing signed a "memorandum of agreement" to buy all the outstanding common stock of two Slayton organizations that sold Managed Funds' shares.

• **Substituting Names**—But a little later Townsend persuaded the six directors left behind by the Slaytons that he could offer a better deal than Channing. On the proposed contract with Channing, in Townsend's words, "we scratched out their name and inserted ours," and Townsend took over the two sales companies—which no longer had contracts with Managed Funds but still had 100 or so salesmen.

At this point, it looked as if Townsend was in the driver's seat. In June, the directors issued a statement backing the Townsend bid to take over sales and management. On July 22, two vacancies on the board were filled temporarily by election of Townsend himself and Gen. Albert C. Wedemeyer, then an official of numerous Townsend enterprises. And on the same day Townsend announced a proposed new slate of officers and directors that would have put him in direct control. The roster, to be presented for approval at a special stockholders' meeting, included five holdovers from the Slayton-era board.

CHANNING'S empire has been built by Chmn. Kenneth S. Van Strum.

But SEC frowned on nominating for reelection some of the same directors who had offered little or no opposition to the Slaytons' maneuverings. Informally, SEC staffers made known that proxy material to call the special election would never be cleared if the holdovers stayed on the slate.

• **November's Board**—So a new slate was prepared, with only Gen. Wedemeyer identifiable as a Townsend partisan. This time, SEC cleared the proxy material, and the directors were elected Nov. 4.

The new board, which became known as the "November" board, immediately set to work to select a new investment manager and sales organization. It also had to write a new prospectus for the fund in order to sell

shares again; last July 30, SEC had suspended the old one.

But the "November" board was no more successful than its predecessor in getting Managed Funds rolling again. One director after another resigned—principally because of disagreement over hiring an investment adviser. As a last resort, four board members approached a number of larger mutual funds on the possibility of a merger.

Merger negotiations reached the "serious" stage with One William Street Fund. But then, according to the four "November" directors, Townsend threatened a proxy fight inside Managed Funds to force One William to back out. Denying any threat, Townsend retorts that all he did was "bring to the attention of Dorsey Richardson [One William's president] that Managed Funds' directors were not unanimous in recommending merger."

• **No Quorum**—In late December, because of further resignations from Managed Funds' board, there was no longer a quorum of five. It became clear that still another board would have to be elected at still another stockholders' meeting. The four survivors of the "November" board refused to run again.

Townsend started girding for a proxy fight at this juncture. It was obvious now that he would have competition for Managed Funds' investment advisory contract, worth an estimated $300,000 a year at the least. But he was confident of victory, since the former Slayton sales force was working for him. He had paid the salesmen more than $350,000 in salaries, independent of sales production, to keep them together. Even the Channing forces agree that if he had not done so, share redemptions would have been so high that no fund would have been left to fight for.

• **Return to the Lists**—Channing Corp. didn't reappear in the controversy until mid-January, when the four remaining members of Managed Funds' "November" board offered to support a Channing slate of directors if Channing would oppose Townsend. It's not entirely clear why the four turned antagonistic to Townsend, though Clinton Davidson, Townsend's partner in many ventures, claims it was because Wedemeyer blocked them from hiring a friend as president of Managed Funds at an "absurdly high salary." Attorneys for the four deny the charge.

After this overture, Channing moved swiftly. "In 15 minutes," says G. Sealy Newell, financial vice-president of the Channing group of mutual funds, "we appropriated $50,000 to start the fight." The battle eventually cost an estimated $100,000. "We figured it was heads we win, tails you lose," Newell continues. "If we had lost, we would still have a terrific list of prospects—the Managed Funds' shareholder list—at an average cost of about $2 a name."

• **On to Victory**—From this point, Townsend's position weakened steadily. Channing made the most of its endorsement by "management"—the surviving directors—and reportedly picked up support from a number of big brokers. Channing also had the 2,000 salesmen of King Merritt & Co., its sales subsidiary, to beat the bushes.

Moreover, Townsend was forced to disclose in his proxy material that two of his companies—Townsend Management Co. and Townsend Corp. of America—had "violated the provisions of the Investment Company Act" in failing to register with the SEC as investment companies for more than a year. Apparently a great many Managed Funds shareholders had had their fill of SEC troubles and didn't want an investment manager that had them, too.

II. Channing Comes Up Fast

The speed with which Channing moved in on Managed Funds is characteristic of the company's rapid expansion.

Though Channing's recent growth has been in mutual funds, it started out in the late 1920s as an investment counselor. Founded by Van Strum, the present chairman, and operating as Van Strum & Towne, Inc., it managed large portfolios for wealthy individuals through the 1940s.

In 1950, Van Strum and his associates acquired control of a ball bearing manufacturer, Nice Ball Bearing Co. of Philadelphia, and a California distributor of auto parts, Chanslor & Lyon. (The name Channing is a free combination of Chanslor and Nice.) Profits from these companies carried the organization while it was building a mutual fund business.

• **Search for Growth**—Channing went into mutual funds because they seemed to offer more growth potential than investment counseling. "After all," says one Channing official, "there's a limit to millionaires in the U. S."

At first, Channing had two small mutual funds, Bowling Green Fund and Technical Fund, both unprofitable. The reason apparently was the lack of a sales organization. "We made up our minds," says Leicester W. Fisher, a Channing man who was named president of Managed Funds this week, "that we were either going to be in the fund business right or not at all."

So Channing sought control of a sales and distribution outfit. It negotiated with King Merritt & Co. and Hare's, Ltd., which together controlled sales and investment management for the Institutional group of mutual funds, and both became wholly owned subsidiaries.

• **Captive Salesmen**—In selling mutual fund shares at retail, Channing believes strongly in the so-called "controlled sales force," where all or most of the salesmen selling the shares work for the same organization. Fisher says that the success of King Merritt's salesmen in soliciting proxies from Managed Funds shareholders attests to the value of a controlled force—over the independent broker-dealer method employed by most funds.

Channing is aiming for a complete financial service, which it feels has a big advantage. Keeping investment management, distribution, and sales all under one roof puts all the profits into one pocket. Channing is even able to give a portion of its funds' security transactions to its subsidiary, Hare's, Ltd., which is both the wholesale distributor for the Channing funds and an over-the-counter house. Out of $1.4-million in brokerage commissions paid by Channing in the year ended last Nov. 30, $396,000 went to Hare's—and another $176,000 to four other brokerage firms whose members serve on the advisory board of Institutional Funds.

The richest profits, though, come from investment management, where the fees are figured as a percentage of assets. This way, the bigger the fund, the bigger the fees—while the cost of advising rises at a considerably slower rate.

III. A Future Worry

In the Managed Funds proxy fight, Townsend made much of the brokerage commissions paid by Channing to Hare's. He also stressed that the Institutional Funds are barred from selling shares in Illinois because Channing owns both Hare's, which distributes these funds, and Van Strum & Towne, their investment manager. These arguments prompted Channing to declare that Managed Funds would give no brokerage business to Hare's.

But though Townsend lost the fight, his arguments are important to the mutual fund industry. Many conflicts of interest are possible when a mutual fund gives commission business to a brokerage house that sells its shares and gives it services. There's always the chance that a fund management will churn its portfolio to keep its broker friends happy—as the SEC charges the Slaytons did.

Many critics say the situation is even worse when the fund and the broker are one and the same. There are few, if any, allegations that these close ties are being abused. But some of the industry's elder statesmen are saying this would be an excellent time to consider just how close a fund's alliance with a brokerage house ought to be. **END**

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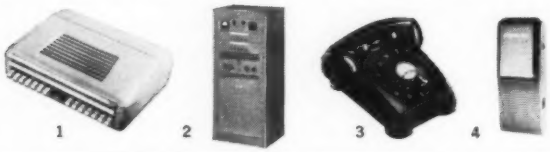

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Wall St. Talks . . .

. . . about Winchell flash, diet drug, merger moves, Federal Funds rate collapse, mutual shake-out.

Walter Winchell still carries some weight with the investing public. On Mar. 21, his syndicated column led off with "Flash! Flash! Philips Electronics will shortly thrill the families of the whole world with a successful vaccine against measles. Nose drops in one dose!" The company's stock rose three points.

Another drug stock getting a ride from a rumor is Mead Johnson, which shot up from 70 to 79 this week on the American Stock Exchange. The story is that its ethical drug, Metrecal, offers painless dieting.

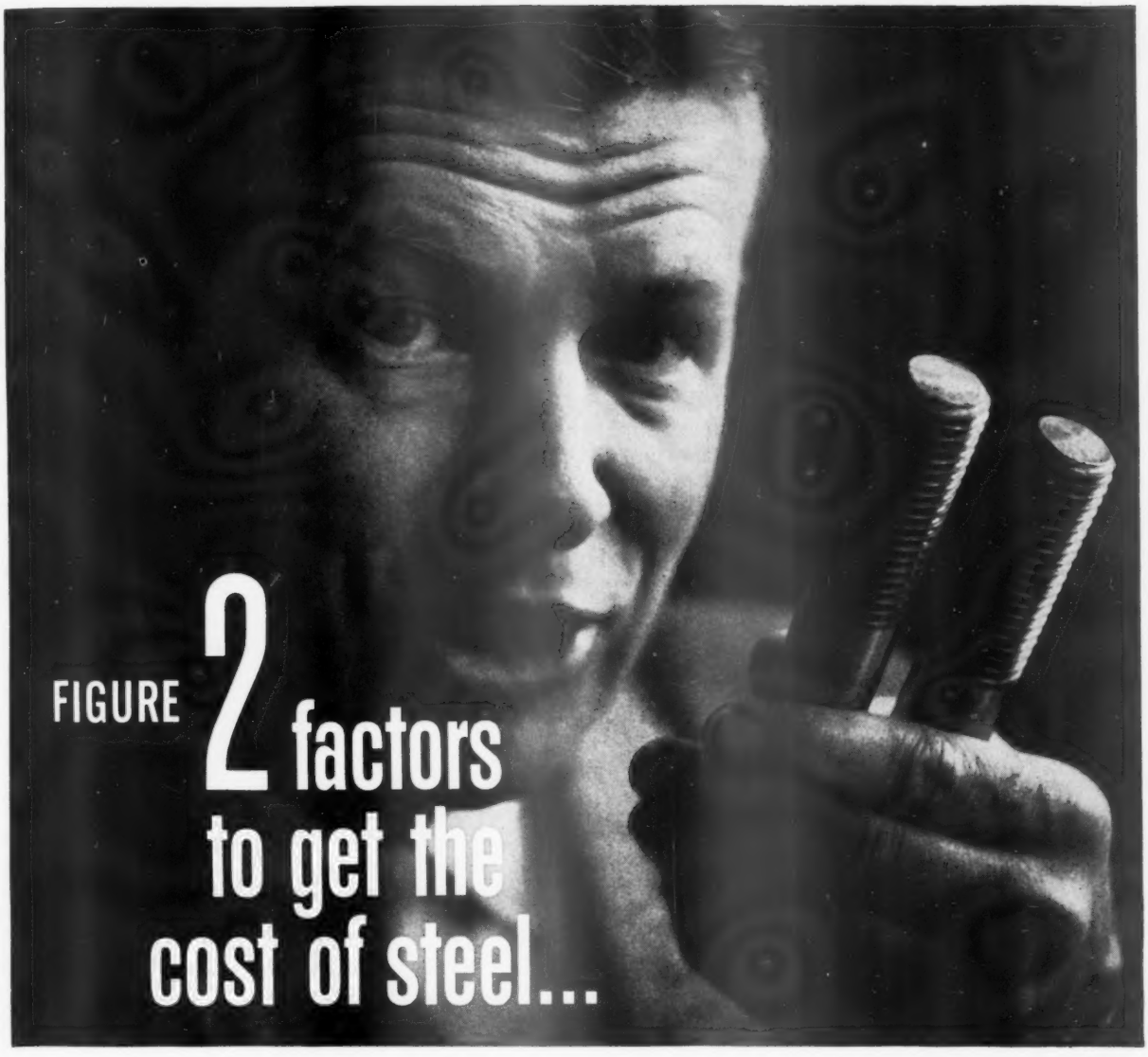
Insiders say Ward Industries Corp. is close to a consolidation with a big shipping line. Ward—a holding company with ties in the ship freight field—has a tax-loss carry-forward of over $1-million, and the line has has been trying to take it over for some time.

Another merger that may be in the making is between H. K. Porter Co. and the Brown Co., a New Hampshire paper and pulp firm. Thomas Mellon Evans, Porter chairman, is reported to have a big stock interest in Brown (BW—Mar. 19'60,p141), and rumors have it that Porter will offer one-fifth of a preferred share, or $20 in cash, for each Brown share, now trading at about 14. A Porter spokesman, who has been nominated for the Brown board of directors, refused to confirm or deny the rumor.

One put-and-call dealer notes that puts—options to sell—are being eagerly sought in electronics companies.

Bankers said technical factors were behind the sudden collapse this week in the Federal Funds rate—from 4% down to 1½%. Both country and city banks had to bring reserve balances into line with reserve requirements on Wednesday—and this led to a big surplus of funds offered from country banks.

Shares of mutual fund management companies, highly touted when first issued a few months ago, are undergoing a shakeout. Hugh W. Long & Co. came to market last August at $32, now is $19.50. Vance, Sanders & Co., a fund distributor, came out in December at $26.50, now is $16.



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Space	_____
Materials handling	_____
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Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

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Per ton, cut-to-size, and delivered

TOTAL _____

In the Markets

• • •

Bond Market Experts Speculate On Long-Term Treasury Offering

Strength in the government bond market—and an accompanying decline in interest rates—this week touched off a rash of rumors that the Treasury will offer a long-term bond—for the first time since early 1958—when it announces terms for its $2.5-billion cash financing next week.

Arthur W. Schlichting, vice-president of the Bankers Trust Co., said that "market yields tell the story." He points to the 4% bonds due in 1969 that are currently trading around par, for a yield of 4%. "At this level," he adds, "there's plenty of room for the Treasury to sneak an issue under the 4¼% ceiling." But he cautions that the size of the bond issue should be held down to $750-million, with the balance coming from an offer of September tax anticipation bills.

C. Richard Youngdahl, vice-president of Aubrey G. Lanston & Co., Inc., agrees. He feels that the market is inviting the Treasury to sell a note or a bond, and that the Treasury "should take advantage of it." He thinks that a 4¼% coupon would be adequate for a bond in the seven- to nine-year maturity range.

Philip V. Mohan, partner in Charles E. Quincey & Co., is more optimistic than his colleagues. He also votes for a 4¼% bond, but thinks the maturity should be pushed out to 25 years.

Robert G. Van Cleave, vice-president of C. F. Childs & Co., Inc., is in accord that the Treasury ought to sell a bond issue, but for a somewhat different reason. He calls the current rise in the bond market "highly speculative," and says that the Treasury should puncture the speculative bubble before it gets out of hand. "It's high time for the Treasury to find out whether these low yields are as solid as they seem," he says.

• • •

Mesabi Iron Studies Plan to Avoid Double Taxation on Royalty Payments

Mesabi Iron Co., whose agreement with Reserve Mining Co. on iron ore shipments has made it a hot market favorite (BW—Mar.12'60,p166), is studying a plan that would avoid double taxation for its stockholders on royalties it receives from Reserve. The news shot Mesabi's stock up six more points to $74 (its 1959-60 low was $31).

Under the agreement, up for approval by Mesabi shareholders Apr. 22, Reserve would pay Mesabi roughly $1 a ton royalty for all iron shipped.

Mesabi now is considering having all the royalties distributed directly to its shareholders. Such a move, Mesabi officials say, could lead to the dissolution of the company, involve pro-rata distribution to its shareholders of certificates of beneficial interest in a trusteeship.

This plan would eliminate the 52% corporate tax the company would have to pay on royalty income. The company believes—without a Treasury ruling to back it up at the moment—that direct distribution of royalties would be subject to a 15% deduction for depletion allowance. The rest would be subject to personal income taxes. Mesabi Iron could deduct the 15% allowance, but then would be taxed at the 52% corporate rate. Shareholders who get distributions, after that, would have to pay another tax as personal income.

• • •

Stocks Move in Narrow Range; Trading Is Still Listless

Stock prices moved in an extraordinarily narrow range this week, reflecting the confusion and listlessness of many investors. Nevertheless, the stability now evident was considered a welcome change from the steady erosion that had been going on ever since the turn of the year. Some analysts predicted that the market was establishing a base for a forward move; others were not so sure, pointing out that technical factors—odd lots buying, trading volume—indicated that any strong upsurge was highly unlikely.

Some institutional investors have been coming back into the market. But they are buying on a very selective basis, choosing their stocks with a great deal of care and refusing to bid up prices. This cautious attitude is in sharp contrast to earlier institutional practices, when mass buying of different groups was common. **In fact,** it is doubtful that there will be an early return to their old ways of mass buying of different groups. While they are still amassing funds for investment, institutions now have the choice of high yielding bonds; even if bond yields decline, they may prefer to keep a bigger portion of their funds in fixed income obligations because the fear of inflation is much less marked.

The fact is that the rediscovery of bonds has produced an accidental windfall for institutions. Early this year, institutions began shifting over to bonds because of the attractiveness of their yields. In the last few weeks, yields have declined as prices rose—both because of demand and because of the expectation that the Federal Reserve was easing credit. Thus, **many institutions have reaped some unexpected capital gains at a time when stock prices were tumbling.**

• • •

The Markets Briefs

Easier credit is causing some **home loan banks to cut their dividend rates.** In Chicago, the Federal Home Loan & Bank Board, area bank for S&Ls, plans to reduce the interest rate it charges members to 4½% from 5%. Similar reductions have been made in Cincinnati, Topeka, and Pittsburgh.

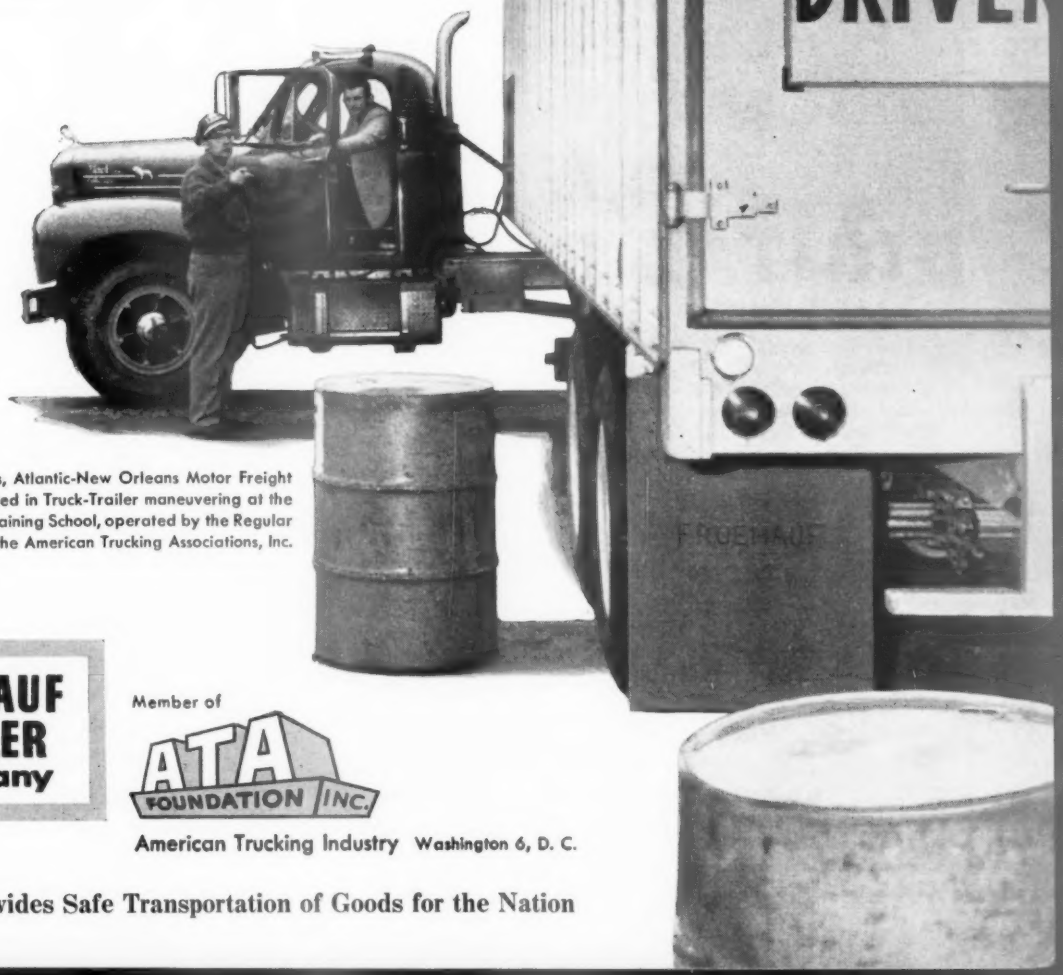
The New York Stock Exchange this week modified its original listing standards for the benefit of venture capital companies, such as the small business investment companies. These companies do not have to meet the usual $1-million net annual earnings requirement to qualify, but will have to have net tangible assets of $16-million, instead of the $8-million normally required.

On the Road to Safety

Caution Trainee Driver . . . A wealth of safety meaning in three words for young drivers being schooled in safe driving regulations and practices, as well as vehicle handling. On college campuses, at busy terminals, and at special schools, drivers like John Stephens (below) are constantly being trained to take their places beside the thousands of professional drivers who daily carry your goods swiftly and safely over America's highways.

Trucking safety begins on the drawing boards of truck and Truck-Trailer manufacturers. It continues in the preventive maintenance shops of the carriers. It is the backbone of hundreds of driver training programs throughout the trucking industry . . .

In a multitude of ways, the trucking industry accepts its civic responsibility for the safety of America on the highways. As trucking fleets serve the commerce of the nation, their drivers continuously study and work to maintain the industry's outstanding safety record.



Apprentice Driver John Stephens, Atlantic-New Orleans Motor Freight Company, Atlanta, being instructed in Truck-Trailer maneuvering at the William Way Memorial Driver Training School, operated by the Regular Common Carrier Conference of the American Trucking Associations, Inc.

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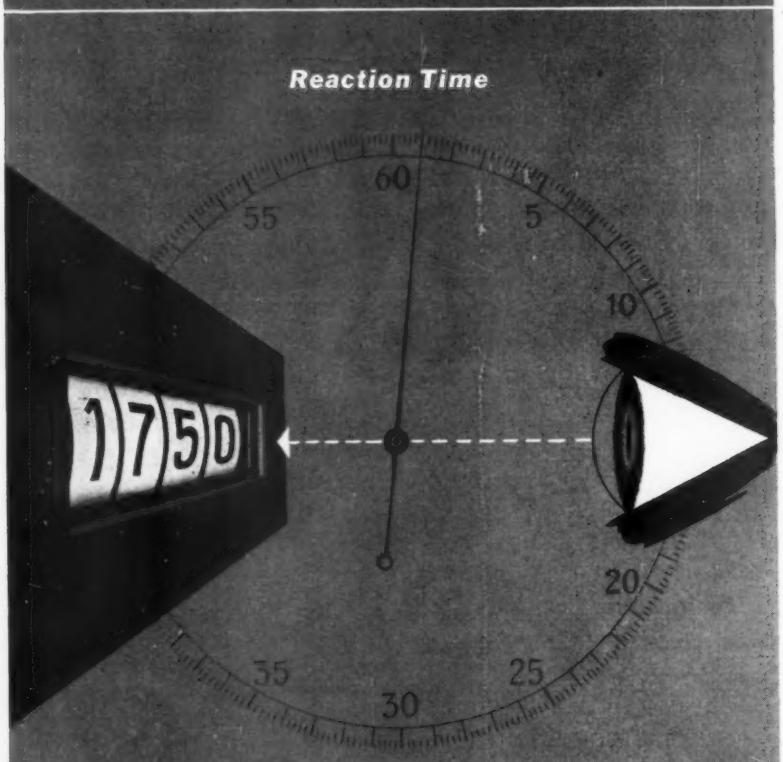

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COMMODITIES

Ore Fleets . . .

. . . are set for early lake shipping start, but steel feels no pinch except in special ores.

Despite many gloomy predictions last fall, the steel industry's iron ore stockpiles are holding well above the danger line. But a few companies, notably U. S. Steel Corp. and Inland Steel Corp., are feeling the pinch for some special grades of ore, and their Great Lakes ore carrier fleets are champing at the hawser, waiting for the ice to clear.

If present Coast Guard forecasts turn out, company-owned fleets will be pushing through the ice-filled lakes a week to 10 days ahead of last year's Apr. 14 opening of the lake shipping season. Because of the over-all satisfactory ore situation, however, most independent ship owners—whose main livelihood comes from the ore fleets and who are therefore reluctant to risk costly ice damage—are biding their time until the way is really clear.

• **Safe Levels**—Though the long steel strike left some company stockpiles of the more desirable ores a little lower than the steelmakers like, these companies are suffering no over-all ore shortage. The steel industry's iron ore inventory on Mar. 1 was only 8.6% below the same date a year ago, according to a BUSINESS WEEK estimate (about 47.7-million net tons this year, against 52.2-million in 1959). With March steel output about the same as a year ago, Apr. 1 stockpiles should still be well above safe levels.

Two facts testify to the absence of any over-all iron ore malnutrition. The price of steelmaking scrap is lower than a year ago, indicating there is no forced switch to increased use of scrap. And this winter has seen no jump in rail shipments of ore.

• **Getting Ready**—In spite of bad March weather, U. S. Coast Guard reports indicate the Great Lakes ice is not so thick as in the same 1959 week. The Coast Guard ice-breaker Mackinaw, scheduled to open the Escanaba, Mich., harbor by this weekend, will go up to the Soo Locks the first week in April if conditions are good.

Pittsburgh Steamship Div. of U. S. Steel hopes to begin moving ships that week. Traditionally, U. S. Steel—with the biggest fleet and ore appetite, and the ability to afford early-season risks—starts the season. But one independent fleet claims its ships, starting 10 days later, get to port almost as soon. **END**

"Hire 'em this week and fire 'em next?"

Doesn't make sense—yet it's still tried in many a plant where the old "hire-and-fire" approach to maintenance holds sway. Goes something like this:

Peak period for maintenance coming up? Hire new crews! Peak over? Fire 'em!

Make sense? Of course not! It's poor public relations . . . it's costly . . . and you're never sure you're getting top-quality work.

That's why more and more companies are turning to *maintenance by contract.* Especially electrical maintenance, where specialized skills are all-important.

You get the skills you need *when* you need them—supervised by men whose job is doing it right the first time and getting on to the next assignment.

You avoid hiring and firing headaches, insurance problems, seniority questions, profit-sharing and vacation problems. To say nothing of the obvious question of where to find skilled electricians for just a week or two.

Your costs are lower with contract maintenance, too. You know exactly what every job costs. You pay only for what you need. And results are guaranteed.

So why not turn your electrical maintenance over to a specialist . . . a qualified electrical contractor? And for some interesting facts on the subject, write today for the free booklet, "MAINTAINING PRODUCTION FOR AMERICA."

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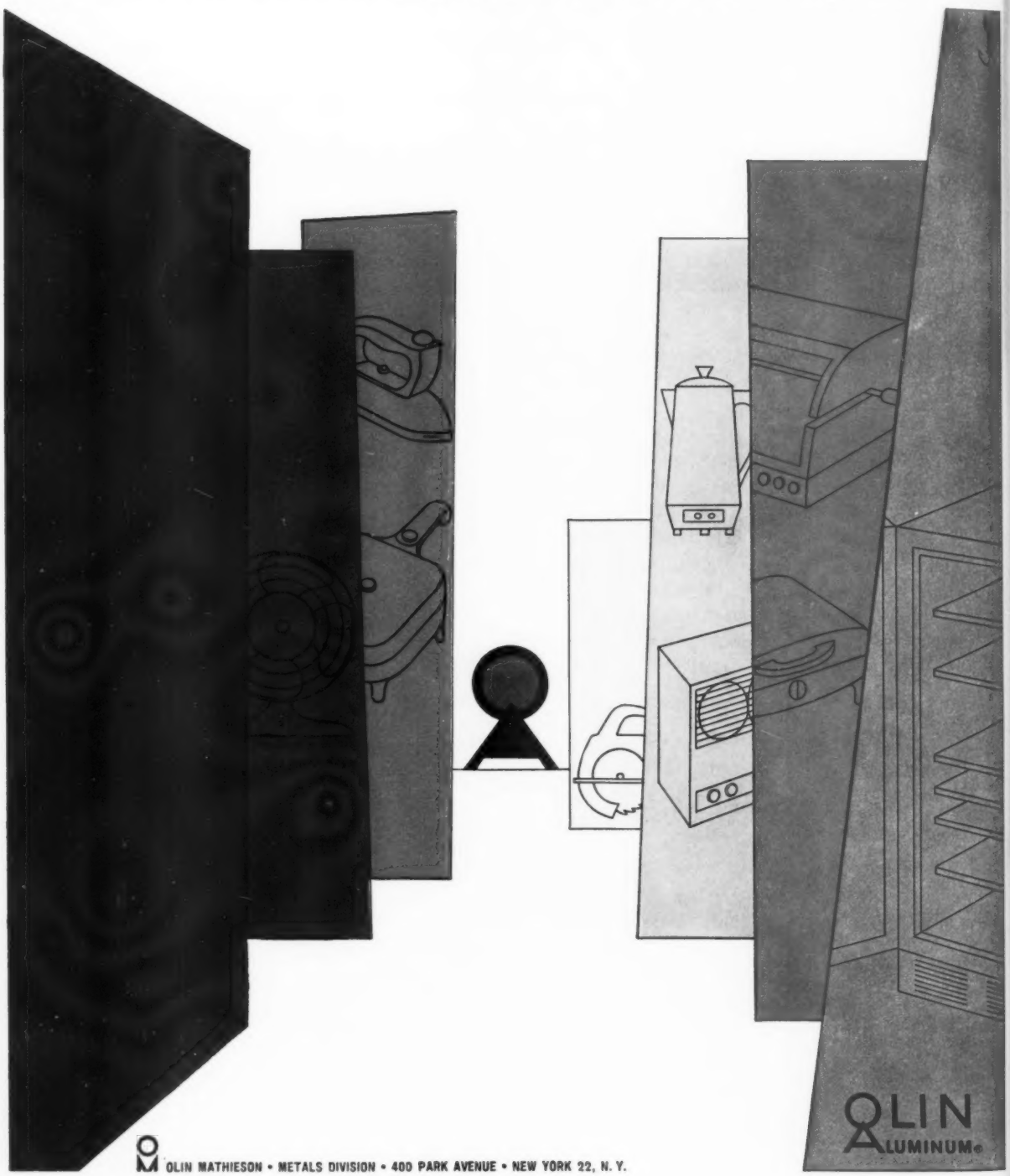

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PERSONAL BUSINESS

BUSINESS WEEK
MAR. 26, 1960

Do you sometimes feel conscious of "getting on" in years—at least, in terms of daily high-pressure activity at the office?

The Institute of Directors (London), a British group often referred to as "top management's trade union," pulls no punches in advising its age-50-and-over members on the art of growing old gracefully behind a desk. And, of course, its findings are equally applicable to the American executive.

If you're an "elder manager," says ID, you have some hard facts to face. First, there are the purely mechanical slowdowns that limit performance, such as failing eyesight and less acute hearing. **But even more of a drawback is having to learn to operate in the office with less physical and mental stamina, less short-term memory ability—and maybe most alarming—with a deep-seated tendency to "live in the past" and thus reject new people, new situations, and new ideas.**

But then ID draws up sharp, and makes these observations:

(1) As a top executive, if you have the drive, you can largely override these limitations just by taking a healthy attitude toward them. This means admitting the strains of advanced age, instead of covering them up—for instance, not feeling ashamed because you need to take a short nap after lunch. **This frank approach may, among other benefits, bolster any sagging relations you may have with the "younger" office generation.**

(2) You'll be surprised at the excellent results of a bit of enlightened self-analysis in this department—basically because, as a top manager, you possess judgment based on hard, long experience. And whether you're a full-ripened or just budding "elder statesman," this quality more than compensates for your age-incurred limitations. **Here the big checkpoint is that far too many older executives greatly overestimate their growing and (to them) apparent encumbrances.**

(3) **If you've entertained the misconception that older people can't learn new things, toss it away.** Experiments have shown that older men—if given reasonable freedom from petty distractions—can learn them as fast and retain them as long as younger men.

Here are some practical suggestions offered the older executive:

• **Daily routine. Learn to slow your work pace—don't try to keep on top of every detail nor a "jump ahead" of everyone in the office.** You can't do it anyway, without great strain—and there's no need to do it in most cases. Use memory-prompting devices (such as notes, diaries, files) as fully as possible, so you can save your memory and display your strong point, judgment. The young men in the office can hash out the detail work.

• **Sanctuary. Put yourself in quiet surroundings, away from the rushing office routine.** Set aside ample periods when you are "not available"—and don't let routine chores interfere. Remember: You're paid to think and advise, and this requires time and tranquility.

• **Good old days.** Maybe they weren't so good; in any case, don't forget that most older people tend to live in the past. **Guard against it in two ways: First, reserve judgment before you reject a new proposal, and take time to sift it—even the most far-fetched suggestion from the most untidy-looking young man in your office.**

And second, enrich your life with broad interests and activities outside the scope of your job. The older executive who relies solely on work for satisfaction in life is apt to become dull and closed-minded.

• **Delegation.** Your job is to define the task, and then let somebody else do the rest. Remember that delegation is one of the highest arts of management, and failure to delegate is a sure way to undercut your function as a manager. **The non-delegator swamps himself with detail, robs himself of the chance to direct operations as he should, and incurs the ill-feeling of every eager-beaver on the staff.**

• **Frustration. Don't worry about yourself, your status, or the threat of waning influence—all this is nonsense.** It's also a common, destructive habit among many older executives. If you find you can't shake this bogey, and it becomes a threat to your happiness (and likely to your efficiency), don't be ashamed to consult an experienced psychiatrist—this may work wonders.

• **Time off. Take at least two holidays a year.**

If your life's routine is well-balanced today, says the Institute of Directors, you won't dread retirement as the time draws near—you'll actually look forward to it. Its final word of advice: **Retire while there is still enjoyment in you.**

—•—

Tax tally: When your income tax return is prepared this year, be sure that all dividends and interest received are properly reported. In a further crackdown on the failure of taxpayers to list such income, IRS has enlarged checking procedures in all local districts. Information returns from banks and corporations will be matched against what taxpayers report.

On another front, IRS has tightened up regulations governing deduction of educational expenses. They now have to be listed in detail (BW—Mar.21'59,p155). Deductions can be taken only if you're actually employed at the time (not on leave); and if you claim them you must show that the expense was necessary to maintain and improve skills for your position. Education merely to establish minimum standards needed to qualify for a position or profession will not be allowed.

—•—

New club: Several executives with international interests have formed the Marco Polo Club for those "who seek to perpetuate friendship and alliances with men of worldwide interests." Lowell Thomas is president and Herbert Hoover is honorary governor.

The club, which opens in May at New York's Waldorf Astoria, has three membership classifications: resident ($250 initiation, $250 annual dues); nonresident ($125 initiation, $125 annual dues); and foreign (no initiation fee, $50 annual dues).

—•—

De luxe air service to end: Major airlines plan to drop de luxe service on North Atlantic routes May 1, following agreements reached at the International Air Transport Assn. meeting in Paris (BW—Mar.19'60,p30).

But **first-class service in the new two-tier structure (first class and economy) will be upgraded** to compare with de luxe service as now offered.

—•—

Dining world: Le Pavillon, one of New York's leading French restaurants and a favorite among executives, now offers a special businessman's lunch for the first time ($7).

—•—

Humor: Jules Feiffer's **The Explainers** has it (McGraw-Hill, $1.50).

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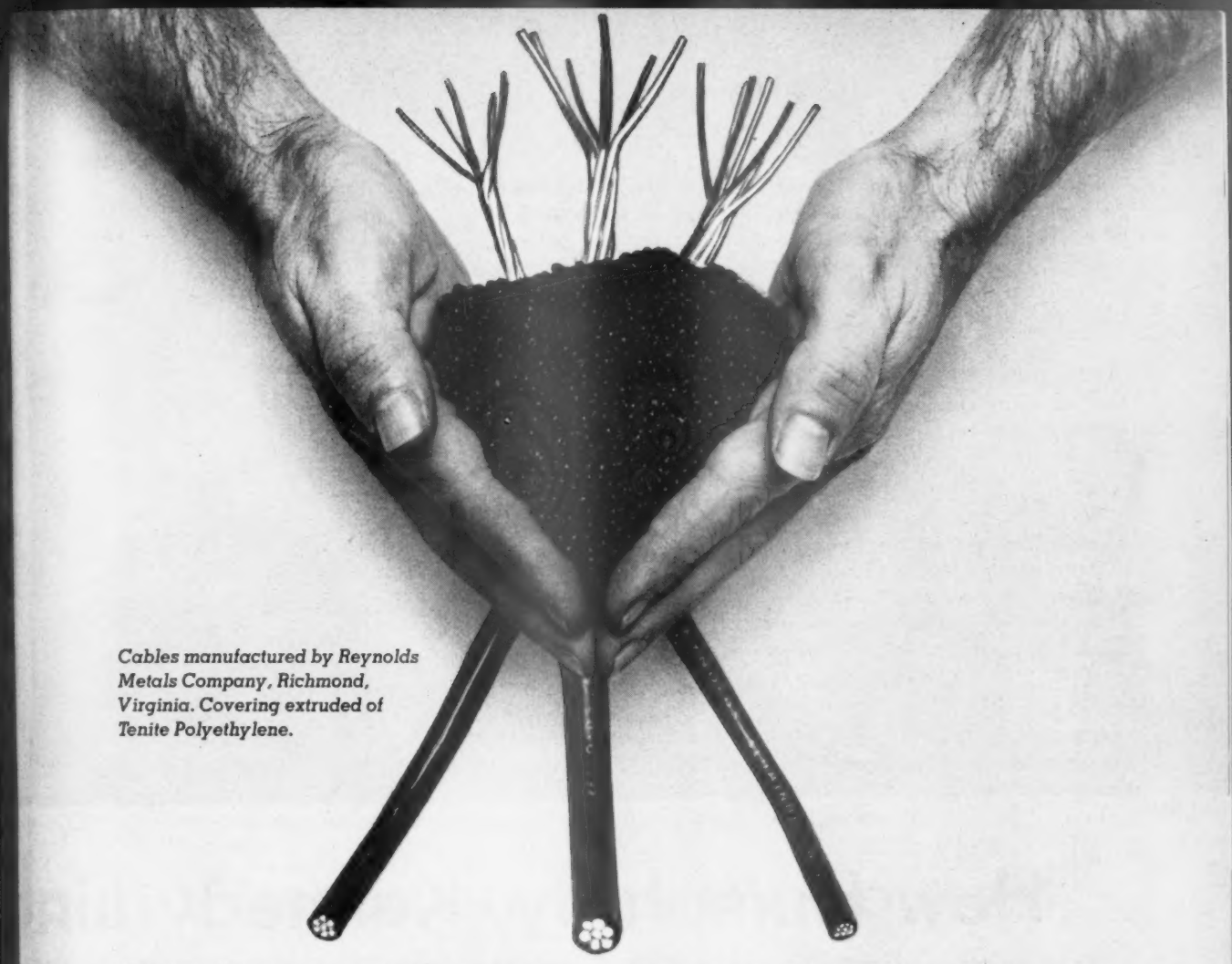

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Why Reynolds covers these aluminum conductors with TENITE POLYETHYLENE

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Tenite Polyethylene is manufactured under as rigid a system of quality control as Reynolds' own aluminum conductors, and makes a tough, weatherproof, fast-stripping covering material which offers high dielectric strength and resistance to abrasion, heat, moisture, chemical attack and stress cracking. It remains flexible even at sub-zero temperatures and its light weight permits easy handling and wide spans. Users report that it gives long service life without festooning or splitting.

Tenite Polyethylene is easily extruded as jacketing or insulation for many diverse applications, from coaxials to control cables, from TV lead-ins to telephone wires. For a material with outstanding electrical, physical and chemical properties, specify Tenite Polyethylene. For further information, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Both natural and black electrical grade Tenite Polyethylene are available to cable manufacturers in a unique spherical pellet form which flows freely in the extrusion process and in "air-veying" of bulk shipments from truck to bin.

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KENNEDY: "The President must care passionately about the fate of the people he leads . . . be willing to serve them at the risk of incurring their momentary displeasure."

HUMPHREY: "The next President must be more than an executive. He must in a very real sense be an educator."

KENNEDY: "I would have no objection to increasing taxes if that represented the best economic judgment at the time . . . if that were the only method by which essential policies could be implemented."

HUMPHREY: ". . . the American people should be disabused of the notion that the internal revenue code is immutable. We can afford what needs to be done."

KENNEDY: ". . . the so-called deficit in balance of payments is not because our manufacturers are pricing themselves out of the market and it is not because our exports have dropped drastically. It is instead because of the heavy outflow of investment capital and foreign aid . . . Restricting our economic growth and our imports would not meet this problem at all."

HUMPHREY: "The Administration's tight money policy only makes it tight for you and me . . . a benefit for the big banks, insurance companies, and other lending institutions."

How Humphrey, Kennedy Line

"It's like an ordinary housewife challenging Marilyn Monroe in a beauty contest."

That's how an urbane political operator whose normal habitat is the U.S. Capitol—a friend, incidentally, of both Sens. Hubert H. Humphrey and John F. Kennedy—summed up the political show that's being staged on the primary election circuit by the two Democrats who are most actively pursuing their party's Presidential nomination.

Put Humphrey, the Midwestern pharmacist turned politician, into the housewife's role. For Miss Monroe, substitute Kennedy, the wealthy and glamorous Easterner.

• **Judgment Day**—If this sounds bleak for Humphrey, that is indeed the way things seem to most detached observers as the time for judgment draws near in the three primaries where the two have chosen to meet head-on: Wisconsin, Apr. 5; West Virginia, May 10; Oregon, May 20. But in politics there are few cinches, a truism well known to both Kennedy and Humphrey and reflected in the desperate campaign pace they have maintained in Wisconsin for the past two months.

The Wisconsin primary, immediate center of all attention, is the most important. Hardly ever can a single state have been so carefully campaigned over—not once, but several times by both sides—in quest of a victory that guaranteed so little. Past winners of Wisconsin Presidential primaries have had precious little luck in gaining the larger prizes—nomination and election.

It is interesting but hardly surprising that this intense job of wooing the Wisconsin voter has produced only the slightest division between the two on the major issues of this time (above).

I. Similar, Not Identical

Congressional voting records, particularly during the last couple of years, and public utterances of Humphrey and Kennedy are remarkably similar. In the meaning that the word "liberal" took on in the New Deal-Fair Deal era, Kennedy and Humphrey present themselves to the public as liberals.

• **Togetherness**—They stand together for federal expansion in the social-welfare fields. Neither shies away from mentioning the possibility that taxes might have to be raised to pay the nation's bills. Both advocate strong guarantees covering civil rights of Negroes and other minority groups. They agree on the nature of the world-wide challenge posed by the 1960s and on what the U.S. responses should be: further and bigger assistance to underdeveloped nations striving toward an economic breakthrough; development of a more versatile military defense while pursuing progress toward disarmament.

Both plead the necessity for a strong executive—a doer in the White House in the tradition of Woodrow Wilson, Franklin D. Roosevelt, and Harry S. Truman. Each, of course, projects himself as just such a man. Both are young and, in a curious continuation of the parallels, they almost share the same birth date. Humphrey will be 49 on May 27; Kennedy, 43 on May 29.

• **Apartness**—Despite this aura of togetherness, there are some differences between the two. These are not being magnified in the current campaigning but could some day prove significant.

Humphrey is much more vigorous than Kennedy in denouncing the Eisenhower Administration's tight money policy. He places much more reliance on economic growth as the wellspring that would finance federal expansion in all directions.

"I myself am convinced that [this]

DEMOCRATIC HOPEFULS Humphrey and Kennedy together stump farming district near Clintonville, Wis.

Line Up in Wisconsin 'Beauty Contest'

can be paid for if we can stimulate our economy to the growth rate America achieved before the 1950s and that it must have in the 1960s," says Humphrey. He adds that closing tax loopholes is a prime necessity to augment the government's revenues.

Kennedy puts no such emphasis or reliance on economic growth and plugging tax loopholes, although he advocates both as desirable. This is a matter of degree, a hesitance by Kennedy to make a commitment where Humphrey has rushed in.

Kennedy has said his commitment on growth and taxing, if and when the necessity arises for making it, would be based on "the best economic judgment at the time." He says he would take into account that inflation is a threat, that deflation is a threat, and that there are other threats in space, in advances of Soviet weaponry, and in the stirrings of the backward nations that lie on what he calls "the southern half of the globe."

II. Reflex and Calculation

"With Hubert you get a reflex," says one keen observer who can best be described as a friend of Humphrey and an admirer of Kennedy. "You always know where Humphrey stands. He has strong lines extending back in the liberal tradition—with strong Populist overtones. You get no reflexes from Kennedy. With Jack, it's cold and calculating clinical research."

Virtually everyone who knows the two men well agrees that Kennedy and Humphrey arrive at their intellectual destinations, so often so close together, by traveling much different routes.

• **Farm Issue**—A difference in geography appears to account for one difference between the two that does exist and is now getting much airing in Wisconsin. That is their past positions on the farm problem.

Prior to 1956, when agricultural Midwestern states deprived him of the Democratic Vice-Presidential nomination, Kennedy had sided with Agriculture Secy. Ezra T. Benson's approach—lowering federal support prices to force crop production back into line with demand. For a Massachusetts lawmaker, at least, it was not a surprising position.

Since then, however, Kennedy has moved to where Humphrey was all the time—in the chorus of Benson critics. With the Democrats cultivating what they hope will be another farmer revolt against the Republicans, Kennedy nowadays apologizes to Midwestern audiences for his bygone support of Benson.

• **Civil Rights**—One other "incident" being cultivated by the Humphrey forces in the Wisconsin campaign appears to owe more to differences in temperament and general approach to problems. In the Senate's 1957 civil rights debate, Kennedy voted with a coalition of Southerners and moderates to require trial by jury—rather than allowing a judge alone to sit—in criminal contempt cases involving civil rights.

Humphrey's "reflex" put the Minnesota senator immediately in the predictable place among those who opposed the jury trial amendment. Kennedy wavered, then turned to consult several noted law professors on the question, among them Paul Freund of Harvard and Mark De Wolfe Howe, a civil rights advocate and expert of long standing.

Detailed accounts published since then say that Kennedy leaned toward the jury trial amendment in the first place and proceeded with confidence to declare and vote for it after his advisers had reached a sort of consensus that the issue was overrated and that the

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amendment would not seriously impair the bill.

Kennedy never wavered—either in 1957 or as recently as two weeks ago—in support of the so-called civil rights "Section III"—the most hated proposal of all from the Southern viewpoint. It would authorize the Justice Dept. to use civil injunctive powers to enforce school desegregation orders and protect other civil rights, including suffrage. Humphrey was, of course, also among the section's supporters.

• **Cool Approach**—The 1957 episode involved only one portion of a complex bill, but it is helpful in illuminating several points: the Humphrey "reflex," Kennedy's calm approach to an issue and his reliance (in all fields, not just civil rights) on a kind of scholarly brain-trusting with a heavy Harvard accent, why some Democrats question the depth of Kennedy's liberalism, and why Kennedy still has grudging political acceptance as something of a moderate among some Southern leaders who find Humphrey totally unacceptable.

III. What Kind of President

On the basis of what is known—and making no allowance for whatever "magic" the Presidency might exert on a future occupant—it is possible at least to make some guesses about what a Kennedy Administration might be like and what a Humphrey Administration might be like.

James MacGregor Burns, a Williams College political scientist, has written in his recently published book, John Kennedy: A Political Profile:

"What would such [Kennedy] Administration do? In some respects, its policies would not represent an abrupt break with those of the outgoing Republican Administration. The sharpest immediate shift would come in federal social-welfare policies.

"Depending on the degree of Congressional cooperation, minimum wages would be raised and exemptions narrowed, social security extended, the new labor policy of 1959 revised where in practice it unduly hurt democratic and honest trade unionism, federal housing and urban renewal subsidies expanded, big federal aid to school construction advocated."

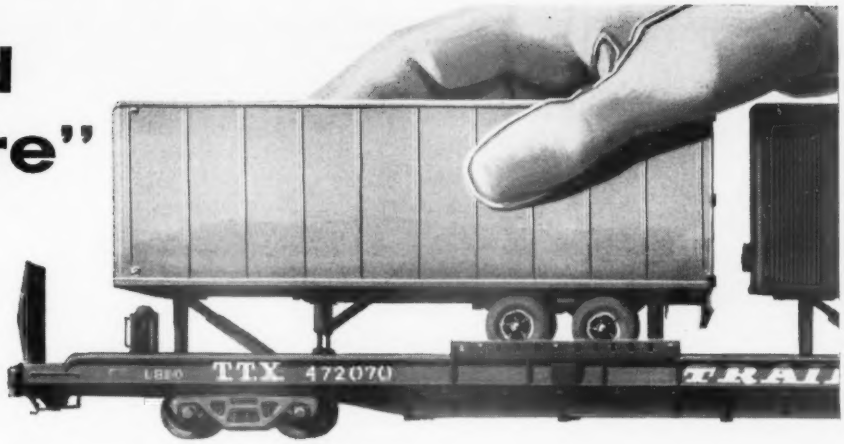
The judgment of most observers is that the same could be written of a possible Humphrey Administration.

• **Welfare Policy**—Burns continues on Kennedy:

"The most striking change might be in the field of family allowances, with a small federal allotment to families for each child, and in medical care, perhaps in the direction of the successful British health program."

Both Kennedy and Humphrey advocate a federal health insurance program

"Handled with Care"



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. . . the intellectual would stage his biggest comeback in national politics since Franklin D. Roosevelt summoned professional brains to the capital . . .

(STORY on page 162)

under social security, and Kennedy only a few weeks ago introduced a bill to accomplish this with a rise in social security taxes. Burns' introduction of the question of family allowances is something new—that is, it is a possibility that has not been explored or tested in public conversations by either Kennedy or Humphrey.

• **Economic Climate**—Burns, who had free conversation access to the senator and unrestricted access to his files, suggests that "the budget would probably be balanced, at least in a time of full employment, not by cutting federal spending—an impossibility under the likely policies of a Kennedy Administration—but by raising taxes, especially income and corporation taxes, and by plugging tax loopholes."

Burns' appraisal, assuming higher taxes to be a virtual certainty under Kennedy, is phrased in much harder language than the senator himself has used in conversations on the topic since then. These amount, in sum, to a determination to cross that bridge only if and when he comes to it.

There is ample evidence that neither Humphrey nor Kennedy would be reluctant to advocate higher taxes under a given set of circumstances, but that Humphrey believes more devoutly that easier money and faster economic growth should provide adequate revenues. The net effect is an impression, which obviously cannot be documented, that Humphrey would be less concerned with inflation.

• **Brain Trusts**—In the event that either Humphrey or Kennedy was elected, labor would have its friendliest reception at the White House since the early days of the New Deal. And the intellectual would stage his biggest comeback in national politics since Franklin D. Roosevelt summoned professional brains to the capital to help him set a national course. It seems safe, however, to say that Kennedy would rely more heavily on the "brainpicking" technique.

In his campaign, Kennedy is drawing extensively on such men as Burns of Williams and the "Harvard crowd" of Arthur Schlesinger, Jr., John Kenneth Galbraith, and Archibald Cox. Cox was at Kennedy's side constantly during the 1959 labor reform debate.

Humphrey would also surround himself with intellectuals of a liberal bent, but it is questionable that he would be heavily influenced by them—particularly, one associate says, if their advice went counter to his political instinct.

Humphrey's closest advisers at this point in his campaign are Max M. Kampelman, a Washington attorney who used to be his legislative assistant; Joseph Rauh, leader of Americans for Democratic Action, and James Rowe, another Washington attorney whose political background includes one stint in the Senate as an adviser to Democratic leader Lyndon B. Johnson.

IV. The Bid to Labor

Most of organized labor is enthusiastic about both Kennedy and Humphrey. Labor has been the prime issue in Kennedy's elevation to the stature of a national figure. Both men have virtually "perfect" records, over the course of their careers in Washington, on the votes that labor rates as vital.

The one exception, of course, is James R. Hoffa and the Teamsters Union. Hoffa is conducting a political vendetta against Kennedy and his brother, Robert, for their role in the McClellan committee hearings that laid bare corruption inside the Teamsters. This is an enmity that Kennedy cherishes (and that has proved a slight embarrassment to Humphrey, inasmuch as the Teamsters—in their zeal to destroy Kennedy—are suspect of lending unsolicited help to the Minnesotan).

• **Reform Bill**—One of Kennedy's big disappointments was his inability last year to obtain final Congressional adoption of a mild labor reform bill. When public protest forced adoption of a bill that he thought was unduly severe, Kennedy asked to have his name removed from the legislation and then voted (as did Humphrey, who had supported him throughout) for final passage of the measure that came to be known as Landrum-Griffin, after its House strategists.

Kennedy has refused to apologize either for his parliamentary failure or for his vote, and most of organized labor likes him. In fact, one observer says: "The labor boys love Hubert, but most of them who are working at all are going to bat for Jack. I think it's as simple as the fact that they suspect Kennedy has the better chance for winning."

V. A Question of Tactics

Neither Franklin Roosevelt nor Harry Truman ever campaigned in a Presidential primary, and history shows that not even a succession of primary triumphs will guarantee the nomination. The other Democratic contenders for 1960—Johnson of Texas, Sen. Stuart Symington of Missouri, and Adlai E. Stevenson—are sitting out this year's primaries.

Why then are Kennedy and Humphrey going at it so feverishly?

• **Something to Gain**—The explanation for Kennedy is astonishingly simple. As the second Roman Catholic in history seriously to aspire to the Presidency, he knows it is imperative to demonstrate tremendous popular appeal. His first need is to allay fears that a Catholic—any Catholic—"can't win." His second is to round up so much strength before the convention that Democrats cannot deprive him of the nomination without alienating the overwhelmingly Democratic Catholic vote.

Without Humphrey in the field as an active opponent, Kennedy would be at a disadvantage—running only against himself and proving nothing.

Was it a mistake for Humphrey to enter the active list? Humphrey thinks not. Knowing the depth of Southern antipathy toward him, he has set out to prove himself the most articulate, electrifying spokesman for liberal Democrats elsewhere. He particularly stresses his Midwestern, agricultural roots and raises doubts that Kennedy can carry the Farm Belt, so vital in the party's master plan for 1960. The Wisconsin primary may provide a clue.

• **Something to Lose**—The same observers who applaud the soundness of the Kennedy strategy have serious doubts about Humphrey's. Some 15 months ago, Humphrey received—and ignored—professional advice that told him, in effect, to stay out of primaries and, through development of issues from his Senate seat, build himself up as the logical heir to Adlai Stevenson.

Under this concept, Humphrey might have emerged especially as the towering national figure on disarmament, through adroit use of the Foreign Relations subcommittee that he heads. But the disarmament subcommittee has not been active, and now Humphrey—while rated an expert on many important subjects—has no dominant reputation as "the" expert on a single one of them as Kennedy has on labor, Johnson on civil rights, and Symington on the so-called missile gap.

Until Humphrey or Kennedy is knocked out by a primary defeat or until Democrats finally decide in their July convention, both of these men have to be examined as potential occupants of the White House. If either should obtain his party's nomination to oppose the Republican nominee-apparent, Vice-Pres. Richard M. Nixon, there would follow a hard-hitting campaign and likely a sharp development of some prime economic issues. **END**

EDWARD BRISCH finds U.S. executives miss a bet, ignore pre-production savings.

MANAGEMENT

European Sets Up a

With six foreign lands using system, Edward Brisch has opened shop in U.S. to show how to "save by classification."

Brisch isn't in the dictionary—yet. Nor will you find it in many textbooks on management. When it does appear, it will probably be as a "verb, transitive" —or more colloquially as: to brisch up the business.

Right now, Brisch is just another name in the Toledo, Ohio, telephone book. It stands for a rather elegant little man, originally hailing from Lodz, Poland, who has recently come to America to show the highly cost-conscious native businessmen some advantages of scientific management that they may have overlooked. But Edward G. Brisch (picture, left) is also chairman and general manager of E. G. Brisch & Partners, Ltd., of London, with branch companies already operating in France, Belgium, Holland, Portugal, and India.

Brisch, a slender, witty man whose impeccable continental attire invariably includes a starched white handkerchief stuffed into a neatly starched white cuff, says, "We've established what amounts to a beachhead here in Toledo." He already plans additional operating units in four or five other cities in the U.S. and Canada.

• **Order Out of Chaos**—Educated as a mechanical engineer in Poland and in France, Brisch is now a specialist in the somewhat abstruse-sounding field of industrial classification and codification—a field closely related, however, to the dollars-and-cents subject of inventory control. This, of course, is a field in which many American consulting firms also offer service. In fact, from the turn of the century, U.S. management engineers have been telling the world that efficient, effective business operation depends upon the identification and orderly arrangement of the facts that count: Who are the men, what are the methods and machines, where are the materials? Every item must be identified, each must be classified, if system is to triumph over disorder, wasteful duplication, and simple human fallibility.

The objective has always been well

SUBSTANTIAL savings are expected by Clark Equipment Co. officials (on couch), now installing Brisch industrial codification system.

a Cost-Saver for U. S. Business

recognized—to get the most from the least, that is, to make the maximum variety of products out of the minimum variety of parts, using a minimum variety of materials and methods. As Brisch likes to put it, maximum ex minimo. To achieve the standardization and simplification demanded, businessmen and their advisers have long been busy introducing one system after another aimed to provide a place for everything and to put everything in its place.

• **Codes and Symbols**—Since even a relatively small business may involve the utilization of hundreds of thousands of items of all descriptions, words alone won't do to name them all. So management long ago undertook the task of applying codes and symbols to all the information that had to be recorded, transmitted, or stored. Both alphabetical and numerical systems are common.

Other systems go in for graphics or for color. And as might be expected, most companies have developed a large collection of different systems to serve various functions and different departments, each requiring a separate index and key.

• **The Brisch Method**—Brisch's experience in this wonderland of signs and symbols goes back to 1926 in Europe. Later, in 1946, following wartime work with the British Ministry of Supply and the War Office, he set up his own firm in London. It soon became a specialist in industrial codification and classification—the only one in the world, he says, exclusively concentrating in this field. Out of this experience have come a philosophy and a set of principles now becoming known as the Brisch method.

The method presumes to solve all the problems that have previously dogged the field. For one thing, it is entirely numerical, and every code number contains the same number of digits. Each digit, moreover, has an exact positional as well as sequential value—each part of the code number having a regular meaning and standing in logical relation to other parts of the number. Even more significant, a single over-all system of classification catches up every conceivable item, literally everything in the entire industrial organization. Organizational structures, staff, raw materials, sub-assemblies, parts, tools, buildings, services, scrap, waste—all are numbered in a way that identifies, describes, and locates and this is done in a manner that makes punched-card handling of the information possible.

• **U. S. Move**—While the application of the Brisch method is still in its first stages in the U. S., it has been put to varying uses by more than 100 companies overseas in a dozen major fields. There his success has brought him fees which rank among the highest in the entire consulting profession. The president of one of England's largest companies wrote him that the first year's experience with the system had saved "four or five times your $150,000 fee."

Brisch believes the U. S. has neglected the field he lays claim to. "First off," he says, "I think anyone has to admit that when it comes to production, you are second to none. Make no mistake about that—American organization for the actual turning out of goods is brilliant."

But, according to Brisch, "pre-production operations are frequently mini-

TRAINING of client's employees at Brisch Toledo offices is feature of system; here, Clark Equipment men get instruction.

ELECTROFILE, marketed by Underwood Corp., uses Brisch coding system to turn up all similar parts among 1,000 filed.

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mized or ignored entirely. Lead times, consequently, are appallingly long, and inventories are fantastically large." What is forgotten entirely is the need for having the least possible range of elements to deal with.

• **Cost of Neglect**—The first step, argues Brisch, before management can even think of eliminating unnecessary variety, is identification. It is here that some of the greatest difficulties arise. "Management must get over the idea that it can rely on nomenclature for identifying things," he says. "For nomenclature is built up by human selection of names that is haphazard, confusing, and inexact." Instead, identification of all items must be precise and unambiguous.

Once identified, and properly coded and classified, then tools, telephone numbers, typewriters, parts, materials—all may be simplified and standardized. Bringing together all like items, revealing duplication, obsolescence, overlapping, and other similarities, can go far toward reducing the cost of holding inventory. In this country, Brisch estimates that cost runs from 20% to 25% annually of the worth of the stock. "In no case since we have been doing this work have we failed to find less than 11% unnecessary variety due to faulty nomenclature and faulty numbering in manufacturing operations," Brisch claims.

• **Savings**—In the U. S. he has already shown a client with sales of some $300-million that its $300,000 stock of bearings could be cut to $30,000 without impairing efficiency. In another company, Brisch says he has reduced 129 varieties of oils to 22. In still another he has cut 600 paint thinners and powders to 278.

And this is not all, as Brisch points out, for unnecessary variety begins in the design department where "designers are essentially poets and artists who want an infinite variety of materials, colors, sizes, shapes, grades, and the like." The designer knows, Brisch adds, "it is difficult if not impossible to determine what is really in stock, what has been designed before, and what is available as a possible substitute," so he is quick to order new materials.

A proper classification code may even make it possible to design a new part to fulfill not only its own function but the function of one or more existing ones, which in turn can be eliminated. "Any time the design of a new part or tool can be prevented," Brisch asserts, "it means the saving of at least $500. And when the designer can be encouraged to use what is at hand—provided he can find it—it means a saving not only in money but in cutting lead time to actual production."

• **Clients**—Brisch's first two major U. S. clients were the DeVilbiss Co. and Owens-Illinois Glass Co., and this explains his Toledo-based American operation. Beyond this, he has been classifying and coding 90,000 parts for Clark Equipment Co., personnel functions for Clevite Corp., and doing similar jobs for Libbey-Owens-Ford Glass Co., General Electric's Lamp Div., Johns-Manville Fiber Glass, Inc., Underwood Corp., Thompson Ramo Wooldridge, and Deering-Milliken.

The Brisch procedure for these and other companies is to bring key company personnel into the Toledo headquarters. There a staff of 15, including four specialists transplanted from London, trains the client's classification and coding team, goes through the actual setting up of the new system with them, helps install the system in the company, and then follows up. A program involving up to 50,000 items normally takes about a year.

• **Results**—It is still too early to assess the success of Brisch's U. S. installations. Bruce Smith, administrative assistant to the general manager of Clark Equipment, says it's much too soon to pin any monetary value to a system that won't be fully implemented for a couple of years; but Clark's own studies have convinced it savings will be "very substantial."

A DeVilbiss official reports his company is about one-third of the way through, having been working on putting in the Brisch system for about a year. He also reports optimistically that it is already paying benefits. Actual renumbering of thousands of parts is a relatively inexpensive job, he says, and the work's transitional nature gives time to train people as they are needed.

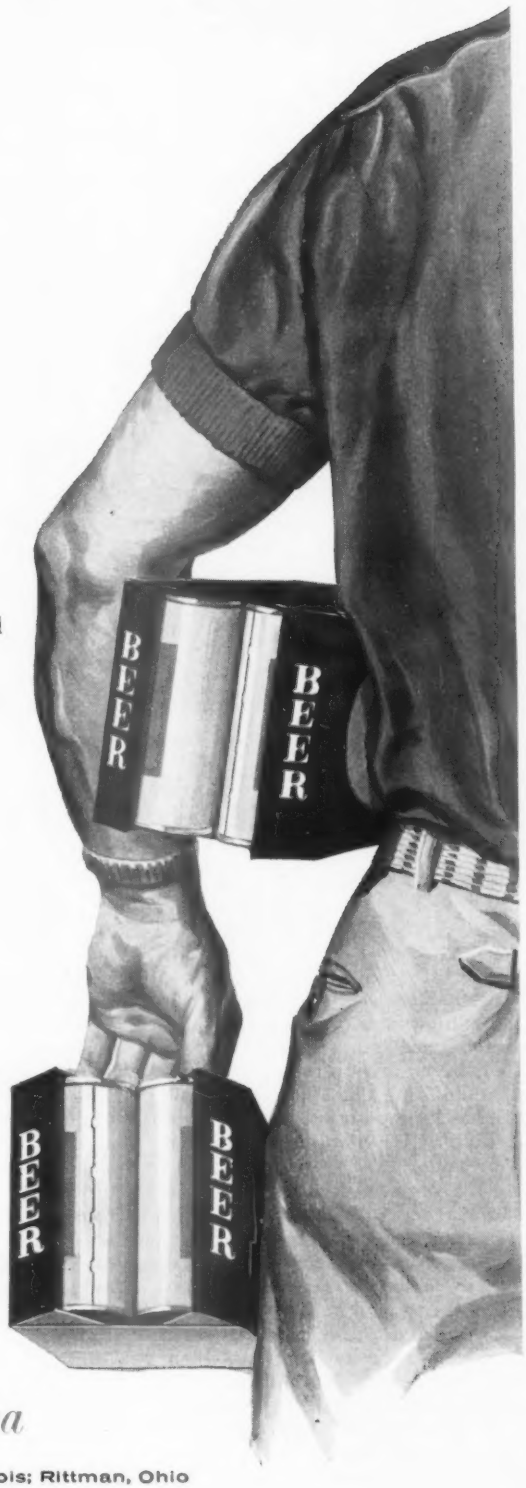
• **Next Goal**—Brisch, however, is not satisfied to be one of the half dozen foreign consulting firms making a success on the home grounds of scientific management. While his small company proves again that knowhow doesn't come only in packages marked "made in U.S.A.," his latest enthusiasm is to move in on the U. S. government itself.

"When I think of the millions and millions of dollars a system like this could save the taxpayers of this country if it were ever to be installed on the federal level," says Brisch, "it makes me shiver."

Every agency of government, to be sure, has of necessity developed coding and classification systems. But in general, the government uses an 11-digit system—enough, Brisch says, "to cover 100-billion items, minus one; and even Uncle Sam doesn't have that many."

Right now Pentagon officials—who have long been working toward standardization and a common inventory to eliminate duplication—are discussing with him the possibility of streamlining and improving federal procurement and materials handling procedures. **END**

Planned Packaging moves merchandise



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Crossing the ice bridge near Fort McMurray, the first of nine plant sections—each on self-contained runners—starts the 35-mile "skid" to the site

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A Kellogg characteristic that pays off for clients is getting plants on stream on time. For Cities Service' tar sands project in Northern Alberta, this meant not only designing and building a small diluent recovery and visbreaking plant off-site in record time but shipping it 300 miles by rail, then 35 miles by sled.

Lacking highways, railroads, docks, the site can be reached with heavy equipment only in winter by sled. Once the thaw starts, March 15, tractors bog down, wheeled vehicles are useless, the nearby river—lacking bridges—is impassable. With March 15 as the absolute deadline for delivery, Kellogg started a crash program when given the assignment in November.

Avoidingconventionaldrawings,Kellogg engineered and designed the pilot plant on a scale model, completed it by December 15, shipped it to fabricators in Edmonton as sole reference in building to full size. Meanwhile, as early as November 1, The Canadian Kellogg Company in Toronto had commenced procurement of basic materials and equipment.

By December 15, preliminary fabrication steps were well under way at Edmonton. Auxiliary equipment was beginning to arrive on order from Canadian Kellogg. Necessary subcontracts had been let in Edmonton, and work carefully coordinated.

Before the end of January, the first complete section of the plant had been dispatched to Fort McMurray. By the first week in March, all sections had been sleighed from this railhead to the plant site. To facilitate this last 35-mile trip, each section was designed so that its structural steel could be used as runners.

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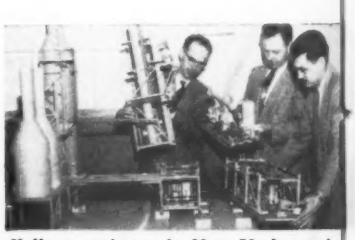
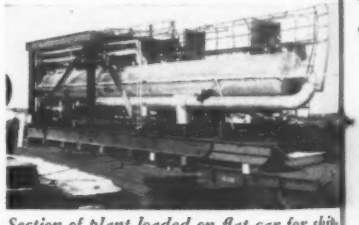
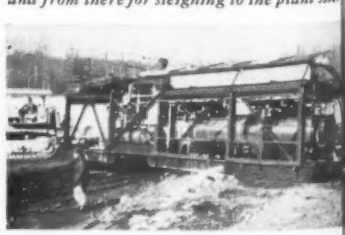


Kellogg engineers in New York examine model of plant, used in building to full size before shipping to fabricators in Edmonton.



Section of plant loaded on flat car for shipment to Fort McMurray, nearest railhead, and from there for sleighing to the plant site.



Section of plant on way to site. Premature melting of snow in places required dragging of unit on dirt roads. Note integral runners.

In Management

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The Tax Collector, Not the Company, Takes the Rap on Swindle Sheets

If the executive expense account really is a swindle sheet, the government—not the company—is the victim. That's the prevailing opinion of some 2,800 executives recently surveyed by the Harvard Business Review.

More than 90% of the executives reject the idea that employees view expense accounts as a chance to make money on the company. But more than half concede that from the Internal Revenue Service's point of view there is some "abuse," and nearly two-thirds believe that companies often use expense accounts to give tax-free salary increases.

Most of the executives put the blame on the tax structure rather than on businessmen. "The tax laws have gotten to such a point that the rewards of evasion through charging to the company are simply too great," said one president.

Companies protect themselves fairly well against expense account abuses, the survey suggests. More than half the executives have to document their expense reports, and only 7% are never required to itemize any of their expenses. Few companies, however, put specific limits on the amount of corporate money an executive can lay out for dinner or a hotel room—partly for fear the maximum will become the standard.

The higher the executive's rank, the looser is the company's control, the Harvard study shows. It says, "While all executives are expected to live comfortably on the road, some are expected to live more comfortably than others." Another plus for rank: Nearly three-fourths of the top executives take their wives along on trips occasionally, and most of the time the company foots at least part of the bill. Less than half of the lower-level managers have the same privilege.

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Johnson & Johnson Reverses Decision, Will Send Out Proxy Statements Next Year

Johnson & Johnson, one of the last holdouts against the New York Stock Exchange's campaign to have all its listed companies solicit proxies for annual meetings, indicated this week that it plans to give in. John J. Gibson, vice-president and general counsel of the surgical dressings manufacturer, said the company had been "perfectly willing to give the information" required in SEC proxy statements but "we simply thought proxy solicitation was a waste of money." Management owns two-thirds of the stock.

Last April, when the NYSE said it would consider delisting firms that don't solicit proxies, J&J's Chmn. Robert W. Johnson said the company might risk being delisted rather than go along. He said **the information required by SEC on a proxy statement was not "conducive to the welfare of Johnson & Johnson or most other companies"** (BW—Apr.18'59,p78). Only half a dozen or so NYSE-listed companies have not yet fallen into line.

J&J's turnabout is too late for the 1960 annual meeting next month, but starting in 1961—NYSE's deadline year—the company's 5,000 stockholders will get proxy statements listing such information as company officers' salaries and the stock holdings of directors.

• • •

Hertz Foundation Handles Details Of Business-Sponsored Scholarships

Companies can sponsor engineering scholarships with no fuss or overhead expense by turning over the job of selecting candidates and administering the program to the Hertz Foundation.

The idea grew out of the foundation's experience of turning up more worthy scholarship candidates than it could provide for out of its own funds. The foundation, a project of John D. Hertz, founder of Hertz Rent-a-Car, has awarded 64 scholarships of its own in the last three years.

Under the new program, all contributions from companies or individuals go directly for scholarship assistance, with the Hertz Foundation absorbing all administration costs. Sponsors can select scholarship recipients from the Hertz files or they can simply have the foundation designate a student. And the donor company can have the awards it provides bear its name if it wishes. So far, 13 individuals have taken advantage of the program.

• • •

Management Briefs

C. B. Burnett, president of Johns-Manville Corp., will become the company's chief executive officer Apr. 1, when Chmn. A. R. Fisher retires. There will be no chairman. To help Burnett watch over J-M's 10 operating divisions, three of the divisional managers will take on the additional job of reviewing the other divisions' growth plans and advising their managements. These men, Reed S. Hammond, Don L. Himmon, and Robert F. Orth, have already been made senior vice-presidents; a fourth senior v-p with similar responsibilities will be designated later.

Champion Paper & Fibre Co. got two new top executives last week following the death of Pres. Reuben B. Robertson, Jr., who was hit by a car Mar. 13. The new president is Karl Bendetsen, 52, formerly executive vice-president of operations. Dwight Thomson, 44, grandson of the company's founder, was named chairman. He succeeds 81-year-old Reuben B. Robertson, Sr., now honorary chairman.

Harvard Business School's Middle Management Program for 28-to-35-year-old executives, which has been in limbo for the past year, will re-emerge Aug. 28 as a 17-week Program for Management Development. The old course, which lasted eight months, was dropped because companies wanted a shorter one. They weren't willing to pay tuition plus salary for relatively untried executives over such a long period.

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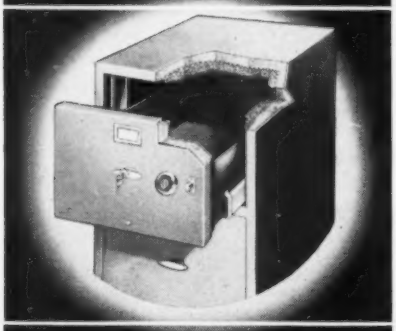

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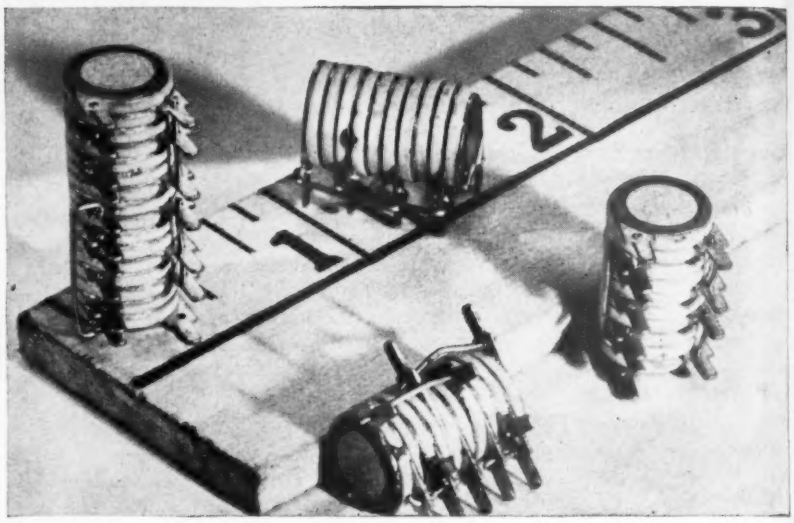

Midget Electronic Circuits

The gadgets shown in the picture are actually complete electronic circuits so small that one can use them to build equipment having a million electronic components per cubic foot. Dubbed TIMM (thermionic integrated micro module) circuits by their maker, the General Electric Co., they were developed in GE's Receiving Tube Dept., Owensboro, Ky. Tiny metal and ceramic discs replace the conventional resistors, capacitors, coils, grids, anodes, and cathodes. To form the desired circuit, the discs are stacked and sealed into little airtight cylinders. GE says 20% less components and 40% less electrical connections can be used to perform the same functions as present circuits.

The most unusual characteristic of the TIMM circuits is that, after external heat is briefly applied to start them off, they become self-heating by utilizing the heat energy they dissipate in operation. GE says this means there is no power loss from heat waste and no need for the cooling systems that are required by transistors or tubes at high temperatures. This in turn contributes to the small size of TIMM circuits.

The company predicts that TIMM circuits will someday reduce electronic computers to the size of a pack of cigarettes and airplane guidance systems to the size of the Manhattan telephone directory. Engineers are testing them right now for possible telemetering and guidance applications in space missiles and satellites.

Contour Package Film

A new plastic film for contour packaging that is the result of bombarding polyethylene with a beam of electrons has been announced by the Cryovac Div. of W. R. Grace & Co. It is said to be the first entirely successful shrinking film that is permeable to air.

By means of a stretching technique called "orientation," certain plastics can be made as a thin film that is later heat-shrunk to form a skin-tight cover around an object of any shape. In the past, the plastics strong enough to stand up under this stretching and shrinking were too dense to permit air to pass back and forth through the package. This is all right for frozen meat or poultry. But fresh meat, fruit, and vegetables must be able to breathe after being wrapped.

Cryovac subjects polyethylene, an ideal material since it lets in air and keeps out water, to about 2-million

The high-speed, high-capacity Divisumma 24 combines a remarkable "memory" with automatic retention of a constant, and provides an easy-to-read tape record of all operations. Automatic re-entry of intermediate results makes the Divisumma 24 especially useful for multifactor multiplication and combined operations. No operator training is required. Olivetti Corporation of America, 375 Park Avenue, New York 22, N.Y.: branches or dealers in all principal cities.

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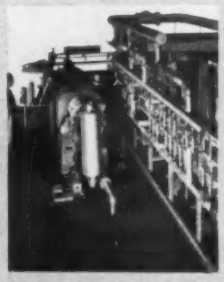
Mechanized drop forging will change your future



The cost-cutting advantages of the automatic production of forgings in closed dies will enable drop forgers to produce more efficiently and more competitively than ever before. Automatic forging equipment, designed and built by Chambersburg, is at work today in a number of plants. Motion picture studies of these installations are available for individual executive or group showings. Consult Chambersburg. A copy of the booklet, "The Automatic Production of Forgings in Closed Dies" will be sent on request.

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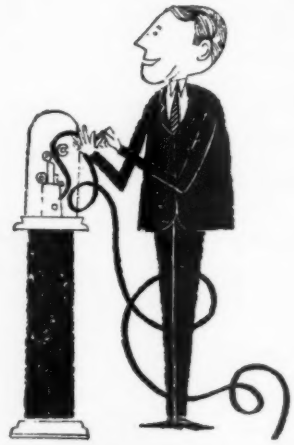

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electron volts of energy (far less, according to the company, than the amount that could make the material radioactive). The company says this produces a film that is extremely elastic, clear as cellophane, and six or eight times as strong as conventional polyethylene. It can be stretched more than 200% and shrinks rapidly almost to its original size on exposure to hot air or hot water. The company claims that no previous plastic film will shrink as fully or energetically.

Cryovac expects to find markets for this irradiated packaging material in fresh and frozen meat and poultry, produce, and bakery goods, saying it provides contour packages that will protect food during shipping, extend its storage time, and allow it to be clearly displayed. Cost is 3¢ per 1,000 sq. in., about the same as cellophane.

Expendable Pallets

A new design in expendable pallets for carrying heavy loads is being placed on the market. The pallets, made of corrugated paper and weighing only about 5 lb., come in various sizes that are said to handle loads up to 1,500 lb., up to 3,000 lb., and up to 10,000 lb.

The main feature of the new pallets is that their triangular legs fold so that they are shipped or stored as flat boards requiring little space: 100 to 150 of them will go in a 4-ft. stack. They are quickly and easily assembled for use as shown in the picture.

The designer, L. Davidson, a New York consulting engineer, says that patents are pending and two companies, Star Corrugated Box Co. and Connelly Containers, have already been licensed to manufacture and distribute the pallets. Price, depending on capacity and size, ranges from about 70¢ to about $1.25.

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The Uphill Road to Disarmament

It is generally acknowledged in the West today that disarmament is the one critical problem on which some constructive agreement, however limited, might be reached at the summit meeting in May. In the case of Berlin, the other major summit issue, there is virtually no chance of a meeting of minds that would serve the interests of peace.

East and West already are engaged in two sets of closely related disarmament negotiations at Geneva —a U. S.-British-Russian conference (now in its 16th month) on a nuclear test ban; and a new, 10-nation conference on general disarmament. Both conferences involve the key problem of nuclear weapons and specifically the issue of international controls. And from each there may come certain areas of agreement for consideration at the summit.

In the test ban talks, the Russians have just offered what may prove to be a constructive compromise. In a reversal of their former position, they have accepted conditionally the U. S. proposal that small underground tests be excluded from a test ban agreement until the means for policing them can be agreed on. The Soviet condition is that the West accept a moratorium on such explosions for four or five years, during which joint scientific studies would establish the means for detection.

This Soviet counter-proposal seems encouraging so far as it goes. The trouble is that it does not provide for controls that would guarantee compliance with the moratorium. Unless Moscow agrees to such controls, or to a much shorter moratorium (during which joint research on detection would be rushed), it will have to be assumed that the Soviets are not acting in good faith in proposing this compromise.

It would be unwise to expect any substantial progress in the 10-nation talks on general disarmament. Here, a basic difference in approach seems likely to block the way to any early agreements. Western proposals give priority to methods for controlling any concrete disarmament moves. The Russians continue to push their grandiose scheme for total disarmament in four years, but are vague about control and inspection.

Still, the U. S. has advanced one proposal at the 10-nation talks that deserves careful consideration in the next few weeks and finally at the summit. This is a proposal for banning the use of space vehicles for nuclear weapons. Such a ban has the advantage of applying to weapons that still have to be developed rather than to weapons that have already been stockpiled. In theory, at least, neither side would stand to lose from a ban like this.

Unfortunately, the first Soviet reaction to a "space ban" was negative. Soviet spokesmen at Geneva seemed to suggest that Moscow was certain it had a lead in space vehicles possessing a military potential, and that it would not give up this lead for the sake of making a start toward general disarmament.

It can only be hoped that the Russians have not said their last word either on an underground test moratorium or on the banning of nuclear space weapons. If they have, the prospect is indeed discouraging. But it is worth remembering that disarmament negotiations are always an uphill proposition. So much is at stake in the Geneva talks —for Russia as well as this country—that it is hard to believe that some good results will not emerge from them eventually. The free world must hold to this hope as long as the talks go on.

$500-Million on a Pinhead

For a case study of what organized research can mean to industrial growth there is nothing more startling than the semiconductor industry (page 74).

From a glimmer in the minds of a small group of physicists 12 years ago, semiconductors have grown to a $500-million business. Few people outside of the industry would recognize a transistor if they saw one. But these tiny products—built to the scale of a pinhead—promise changes in the world comparable to those wrought by the steam engine.

Already semiconductors have liberated electronics from many old limits of size, cost, and breakdowns. Neither big computers nor missiles, for two examples, would be practical without these tiny almost failure-proof devices.

These characteristics are creating a new kind of industry—one that already refuses to fit neatly into the old classifications. It is rooted in physics and chemistry, in metallurgy and electronics. It is, in an important sense, not one neatly definable industry like steel, but a diffusion of technology and skill that will become essential to many industries.

The key to understanding this industry is to know that it is built on brainpower—and, on this, no one has a monopoly. The Russians, by an estimate of C. Guy Suits of General Electric, have a quarter of all the engineers trained in semiconductors in the world. The Japanese have made some of the most important advances in the art.

Most Americans as yet have seen little of this industry. The great bulk of its products go to the military or into the equipment of other industries. But the U. S. has an excellent record in semiconductors because of our skills in translating scientific innovations into profitable, useful products.

If the industry can maintain its astonishing pace, the U. S. won't have to fear for its eminence in this most promising field.

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COLUMBIA UNIVERSITY, with the support of the Office of Naval Research and the Atomic Energy Commission, operates a 400-million-electron-volt cyclotron. A product of Shell Research solved a heat problem.

David's sling at Sleepy Hollow... *10 years later*

High above the Hudson River, near where Washington Irving wrote his Legend of Sleepy Hollow, Columbia University operates an atom-smasher called a *cyclotron*.

Working on the principle of David's Sling, it whirls the nuclei of hydrogen atoms at 140,000 miles per second, then sends them crashing into other atoms.

But in operation the cyclotron's great electromagnet generates heat which cannot be dispersed by conventional techniques. Columbia, working with Shell scientists, solved the problem by bathing the electromagnet in Shell Diala Oil, then using river water as a heat transfer agent. Diala®, chosen for its long life and resistance to oxidation, served for ten full years in the big atom smasher, removing heat without breakdown.

Now, after inspection and cleaning, Columbia University's Nevis cyclotron starts its second decade of use . . . and again Shell Diala Oil has been specified to protect it.

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